# STIC Search Report
EIC 2800

STIC Database Tracking Number 142556

| TO: | From: |
|---|---|
| David Hogans<br>AU 2813<br>Location: JEF-7D30<br>1/19/2005<br>10/760,966 | Jeff Harrison<br>Location: STIC-EIC2800<br>JEF-4B68<br>Phone: 22511<br><br>Email: harrison, jeff |

## Search Notes

**Re: Quantum-Dot Array in AAO nanopores with bottom and cap III-V layers**

**Dave,**

**Attached are edited results from patent and nonpatent databases.**
**Most of the results are about quantum-dot arrays in AAO pores.**
**I doubt that I found the bottom and cap III-V layers used together with the arrays and pores.**

**If you have questions or comments, let me know.**

**Respectfully,**
**Jeff**

**Jeff Harrison**
**Team Leader, STIC-EIC2800**
**JEF-4B68, 571-272-2511**

142556

# STIC EIC 2800
# Search Request Form

Today's Date: 1-12-05

What date would you like to use to limit the search?

Priority Date: 6-25-01 Other:

Name David Hagens

AU 2813 Examiner # 79869

Room # Jef 7030 Phone 2-1691

Serial # 10/760,966

**Format for Search Results (Circle One):**

(PAPER) DISK EMAIL

**Where have you searched so far?**

(USPAT DWPI EPO JPO) IBM TDB

IEEE INSPEC Other _____

**Is this a "Fast & Focused" Search Request? (Circle One)** YES (NO)

Please request a "Fast & Focused" search in-person at EIC2800, JEF-4B68. A "Fast & Focused" Search is completed in 2 hours (maximum). The search must be on a very specific topic and meet certain criteria. The criteria are posted in EIC2800 and on the EIC2800 NPL Web Page at http://ptoweb/patents/stic/stic-tc2800ffcriteria.htm

What is the topic, novelty, motivation, utility, or other specific details defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, definitions, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract, background, brief summary, pertinent claims and any citations of relevant art you have found.

Terms: nanopore, nanochannel, nanowire, nanotube
nano#7, nano-opening

quantum adj dot
Super lattice
array
III-V w/ group

Relevant Arts:
5,332,681
5,264,722
6,139,626
6,177,291
US 2001/0019565

Please Search Clm 1

Crux: forming nanopores w/in anodized aluminum oxide filling the nanopores w/ ~~vertical~~ quantum wires forming a group III-V cap layer thereover

STIC Searcher HARRISON Phone 22511

Date picked up 1-19 Date Completed 1-19-05

```
    FILE 'WPIX, HCAPLUS' ENTERED AT 09:00:12 ON 19 JAN 2005
                E US20040144985/PN
L1              1 S  US2004144985/PN
L2                SEL PLU=ON  L1 1- PRAI :        4 TERMS
L3              2 S  L2

     FILE 'WPIX' ENTERED AT 09:11:31 ON 19 JAN 2005
L4                SEL PLU=ON  L3 1- MC IC :       23 TERMS

     FILE 'WPIX, JAPIO, HCAPLUS' ENTERED AT 09:16:17 ON 19 JAN 2005
L5         225676 S  L4

     FILE 'WPIX, JAPIO, HCAPLUS' ENTERED AT 09:16:38 ON 19 JAN 2005
L6         225676 S  L4
L7         247090 S  NANOPOR##### OR NANO#####(2A)(OPENING OR
                PORE### OR POROS##### OR POROUS#### OR VOID) OR ZEOGRID#### OR
                MESOPOR? OR (ZEOLITE OR ZEO)(2A)(GRID#### OR ARRAY####) OR L6
L8              6 S  L7 AND NON(W) PHOTOLITHOG?
L9          47511 S  L7 AND ?ETCH?
L10             2 S  L2
L11             4 S  L8 NOT L10
L12             0 S  L7 AND NONPHOTOLITHOG?
L13          7199 S  L7 AND (III(2W) V OR (IIIA OR IIIB)(2W)(V
                OR VA OR VB) OR 3(2W) 5 OR (3A OR 3B)(1W)(5A OR 5B) OR THREE(2W) FIVE)
L14          4522 S  L7 AND (CAP OR CAPP######)
L15          1521 S  L7 AND (SUPERLATTIC? OR SUPER LATTIC?)
L16          6478 S  L7 AND QUANTUM
L17          1798 S  L7 AND (NANOWIR? OR NANOROD? OR NANOTUB?)
L18         11653 S  L7 AND ARRAY######
L19         11699 S  L7 AND ?ARRAY?
L20          8076 S  L7 AND ?MATRIX?
L21           101 S  L7 AND ?MATRIC?
L22          5463 S  L7 AND ?LATTIC?
L23          3723 S  L7 AND ?TEMPLAT?
L24          7238 S  L7 AND ?VERTICAL?
L25            65 S  L7 AND AAO
L26          2411 S  L7 AND ANODIZ?
L27           821 S  L7 AND ANODIS?
L28         77379 S  L7 AND (INSULAT####### OR OXIDE OR AAO OR
                AO OR SIO OR ALUMINA OR SIO OR DIOXIDE OR SIO2)(2A)(LAYER####
                OR FILM OR COAT#### OR NANOLAY? OR NANOFILM? OR NANOCOAT? OR MEMBRAN#####)
L29          1221 S  L7 AND QUANTUM(3A)(?ARRAY? OR ?MATRIX? OR
                ?MATRIC? OR DOT OR ROD OR WIRE OR WIRING OR WIRED OR VERTICAL##)
L30            67 S  L13 AND L14 AND (L15 OR L16 OR L17 OR L18
                OR L19 OR L20 OR L21 OR L22 OR L23 OR L24 OR L25 OR L26 OR L27)
L31            21 S  L30 AND L28
L32             4 S  L30 AND L29
L33            23 S  (L31 OR L32) NOT (L8 OR L10 OR L11)

     FILE 'REGISTRY' ENTERED AT 09:34:00 ON 19 JAN 2005
L34        358976 S  (B3 OR A3)/PG AND (B5 OR A5)/PG
L35             0 S  AS.GA/MF NOT L34
L36         75782 S  L34 AND 2/ELC
L37         31068 S  L36 NOT O/ELS,MAC
L38        188446 S  L34 NOT O/ELS,MAC

     FILE 'HCAPLUS' ENTERED AT 09:44:35 ON 19 JAN 2005
L39        279020 S  L37

     FILE 'REGISTRY' ENTERED AT 09:45:20 ON 19 JAN 2005
L40          3376 S  AL.O/MF OR AL O/ELF OR ALUMINA/CN
```

FILE 'HCAPLUS' ENTERED AT 09:45:47 ON 19 JAN 2005

```
L41        1064 S  L40(L)(ANODIZ? OR ANODIS?)
L42        1564 S  L40 AND (ANODIZED OR ANODISED)
L43         423 S  AAO
L44        2012 S  (L41 OR L42)
L45        2408 S  (L43 OR L44)
L46      279999 S  L13 OR L39
L47          52 S  L45 AND L46
L48           0 S  L47 AND (CAP OR CAPP#####)
L49           7 S  L47 AND NANO#######
L50           2 S  L47 AND NANOPOR?
L51           2 S  L47 AND MESOPOR?
L52           7 S  (L49 OR L50 OR L51)
               D ALL HITSTR TOT
L53       17065 S  HEFEI/CS,PA
L54        3257 S  L40(L)ANOD###########
L55        5373 S  L40 AND (ANODI######## OR ANODI#########)
L56       16371 S  ANODI#######(2A)ALUMIN#######
L57        1069 S  AAO OR AAM
L58       19677 S  L45 OR (L54 OR L55 OR L56 OR L57)
L59        1189 S  L58 AND (NANO########## OR MESOP?)
L60          43 S  L58 AND (CAP OR CAPP#######)
L61         127 S  L58 AND QUANTUM
L62         161 S  L58 AND VERTICAL?
L63         708 S  L58 AND ARRAY?
L64         713 S  L58 AND ?ARRAY?
L65           7 S  L58 AND (NANOPILLAR? OR NANOCOLUMN?)
L66           5 S  L58 AND (NANO#######(W)PILLAR? OR NANO#####
               ##(W)COLUMN?)
L67           7 S  L59 AND L60
L68          89 S  L59 AND L61
L69           1 S  L68 AND SUPERLATTIC?
L70           0 S  L68 AND SUPER LATTIC?
L71           2 S  L62 AND L68
L72          69 S  L63 AND L68
L73          25 S  L62 AND L63
L74          29 S  (L72 OR L73) AND (TWO OR SECOND OR
               ANOTHER)
L75          69 S  L53 AND (L60 OR L61 OR L62 OR L63 OR L64
               OR L65 OR L66 OR L67 OR L68 OR L69 OR L70 OR L71 OR L72 OR L73
               OR L74)
L76           0 S  L53 AND L60
L77           0 S  L53 AND L61 AND L62 AND L63
L78           0 S  L53 AND L61 AND L62 AND L64
L79           0 S  L53 AND L61 AND L62
L80          12 S  L53 AND L61 AND L64
L81           4 S  L53 AND L74
L82          11 S  L60 AND (L61 OR L62 OR L63 OR L64 OR L65
               OR L66 OR L67 OR L68 OR L69 OR L70 OR L71 OR L72 OR L73 OR L74
               OR L75 OR L76 OR L77 OR L78 OR L79 OR L80 OR L81)
L83          37 S  (L65 OR L66 OR L67) OR (L69 OR L70 OR L71)
               OR (L80 OR L81 OR L82)
L84          36 S  L83 NOT L52
L85          43 S  L52 OR L83
L86         608 S  L37(L)(CAP OR CAPP#####)
L87       16881 S  L37(L)(SUBSTRATE)
L88          79 S  L86 AND L87
L89          79 S  (L41 OR L42 OR L43 OR L44 OR L45 OR L46 OR
               L47 OR L48 OR L49 OR L50 OR L51 OR L52 OR L53 OR L54 OR L55 OR
               L56 OR L57 OR L58 OR L59 OR L60 OR L61 OR L62 OR L63 OR L64 OR
               L65 OR L66 OR L67 OR L68 OR L69 OR L70 OR L71 OR L72 OR L73 OR
               L74 OR L75 OR L76 OR L77 OR L78 OR L79 OR L80 OR L81 OR L82 OR L83 OR L84) AND L88
L90          79 S  L89 NOT (L84 OR L52)
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FILE 'HCAPLUS' ENTERED

L91           9 S  L90 AND (?OPENING? OR ?VOID? OR ?HOLE? OR
                ?PORE? OR ?POROUS? OR ?POROS?)
                D ALL HITSTR TOT
L92           2 S  L90 AND (NANO########## OR MESO##########)
                D ALL HITSTR TOT
L93        1481 S  (L86 OR L87) AND INSULAT?
L94          25 S  L93 AND (NANO########## OR MESO##########)
L95          25 S  L94 NOT (L91 OR L92)
L96           3 S  L95 AND (?VERTICAL? OR ?PILLAR? OR COLUMN?
                OR SUPERLATTIC?)
L97           1 S  L95 AND  ?COLUMN?
L98           3 S  (L96 OR L97)
                D ALL HITSTR TOT
L99       10535 S  (L41 OR L42 OR L43 OR L44 OR L45 OR L46 OR
                L47 OR L48 OR L49 OR L50 OR L51 OR L52 OR L53 OR L54 OR L55 OR
                L56 OR L57 OR L58 OR L59 OR L60 OR L61 OR L62 OR L63 OR L64 OR
                L65 OR L66 OR L67 OR L68 OR L69 OR L70 OR L71 OR L72 OR L73 OR
                L74 OR L75 OR L76 OR L77 OR L78 OR L79 OR L80 OR L81 OR L82 OR
                L83 OR L84 OR L85 OR L86 OR L87 OR L88 OR L89 OR L90 OR L91 OR
                L92 OR L93 OR L94 OR L95) AND SUPERLATTIC?
L100        383 S  L99 AND (?VERTICAL? OR ?PILLAR? OR
                COLUMN?)
L101        164 S  L100 AND QUANTUM
L102        164 S  L101 AND (L37 OR (III(2W)V OR (IIIA OR
                IIIB)(2W)(V OR VA OR VB)))
L103          3 S  L102 AND (INSULAT####### OR L58)
L104         55 S  L98 OR L91 OR L84 OR L52
L105          3 S  L103 NOT L104
                D ALL HITSTR TOT
L106         78 S  VERTICAL QUANTUM DOT
L107        245 S  VERTICAL(4A)QUANTUM DOT
L108        245 S  (L106 OR L107)
L109          2 S  L108 AND (L58 OR INSULAT######)
L110        101 S  L108 AND (L37 OR (III(2W)V OR (IIIA OR
                IIIB)(2W)(V OR VA OR VB)))
L111          4 S  L110 AND (CAP OR CAPP######)
L112          6 S  L109 OR L111
                D ALL HITSTR TOT
L113        591 S  (L60 OR L61 OR L62 OR L63 OR L64 OR L65 OR
                L66 OR L67 OR L68) AND NANO############
L114        591 S  L113 NOT L112
L115        591 S  L114 NOT L105
L116        553 S  L115 NOT L104
L117         20 S  L116 AND (L37 OR (III(2W)V OR (IIIA OR
                IIIB)(2W)(V OR VA OR VB)))
L118         20 S  L117 AND (L58 OR INSULAT?)
                D ALL HITSTR TOT
```

```
      19jan05 10:39:23 User259284 Session D3029.2
File  2:INSPEC 1969-2005/Jan W2
      (c) 2005 Institution of Electrical Engineers

Set     Items   Description
S1     171836   III()V
S2      91643   R1:R11 OR QUANTUM(2N)(DOT?? OR ROD??? OR WIR????)
S3      30736   S1 AND S2
S4       1821   NANOPOR?
S5      68122   PORE?? OR MESOPOR? OR POROUS? OR POROS? OR S4
S6         89   S3 AND S5
S7         12   S6 AND SUPERLATTIC?
S8         21   S6 AND ARRAY?
S9          0   S6 AND NANOARRAY?
S10        11   S8 AND (INSULAT? OR AAO OR AAM OR ALUMIN?????? OR CI=(AL BIN(S)O BIN) OR CI=(AL
SS(S)O SS)(S)NE=2)
S11         3   S7 AND (INSULAT? OR AAO OR AAM OR ALUMIN?????? OR CI=(AL BIN(S)O BIN) OR CI=(AL
SS(S)O SS)(S)NE=2)
S12         0   S7:S11 AND CAP????????
S13         8   S6:S11 AND CAP??????
S14        36   S7:S13
S15        22   S14/2002-2005
S16        14   S14 NOT S15
S17     26802   OPTOELECTRONIC? OR NANOELECTRONIC? OR NANOOPTOELECTRONIC? OR OPTONANOELECTRONIC?
S18      6834   S1:S6 AND S17
S19       673   S18 AND NANO?????????????
S20       552   S18 AND NANO????????
S21       117   S19:S20 AND ARRAY?????????
S22         2   S19:S20 AND NANOARRAY?????????
S23        18   S19:S20 AND NANOMAT?
S24         4   S19:S20 AND NANOPAT?
S25         1   S19:S20 AND NANOTEMP?
S26         9   S19:S20 AND MESOP?
S27         3   S21:S22 AND S23:S26
S28         2   S27 NOT S14
S29     49893   R1:R11
S30     22796   S29 AND S1:S28
S31      1012   S30 AND CAP??????
S32       906   S30 AND INSULAT???????
S33        16   S30 AND NANOPOR?
S34         7   S30 AND MESOPOR?
S35        39   31AND32
S36         2   S31 AND S33:S34
S37         1   S32 AND S33:S34
S38      9322   1AND30
S39       801   S38 AND R1:R11
S40       205   S38 AND R1:R4
S41       332   S38 AND R1:R6
S42       332   S40:S41
S43      2711   S6:S16 OR S19:S28 OR S31:S37
S44        29   42AND43
S45        20   S44 AND CI=(BN OR BP OR BAS OR ALN OR ALP OR ALAS OR ALSB -
              OR BSB OR GAN OR GAP OR GAAS OR GASB OR INN OR INP OR INAS OR INSB)
S46        29   S44 AND S1
S47        29   S45:S46
S48         4   S47 AND COMPOUND??(2N)SEMICOND?????????
S49        29   S47:S48
S50        29   S49 AND (3 OR 3A OR 3B OR THREE OR III OR IIIA OR IIIB)
S51        29   S49 AND (5 OR 5A OR 5B OR FIVE OR V OR VA OR VB)
S52         8   S50:S51 AND (INSULAT? OR CI=ALO OR CI=AL2O3 OR AAO OR AO OR AAM OR ANODI?????????)
S53        29   S51:S52
S54        16   S16 OR S28
S55        10   S53/2002-2005
S56        19   S53 NOT S55
S57        19   S56 NOT S54
S58         0   S57 AND (VERTICAL???? OR COLUMN????? OR PILLAR? OR NANOCOLUMN? OR NANOPILLAR?)
```

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      19jan05 11:00:48 User259284 Session D3029.3
SYSTEM:OS  - DIALOG OneSearch
  File  94:JICST-EPlus 1985-2005/Dec W2
    (c)2005 Japan Science and Tech Corp(JST)
  File  35:Dissertation Abs Online 1861-2004/Dec
    (c) 2004 ProQuest Info&Learning

Set     Items   Description
S1       1970   AAO OR AAM OR ANODI??????????(3N)(ALUMIN??????? OR OXIDE??)
S2         31   S1 AND QUANTUM
S3         12   S1 AND NANOPOR?
S4          2   S1 AND MESOPOR?
S5          8   S1 AND MESO???????
S6        142   S1 AND NANO?????????
S7       1156   S1 AND (III OR IIIA OR IIIB OR 3 OR 3A OR 3B)
S8        254   S1 AND (V OR VA OR VB OR 5 OR 5A OR 5B)
S9        109   S1 AND THREE
S10        16   S1 AND FIVE
S11      1202   S7 OR S9
S12       263   S8 OR S10
S13       176   11AND12
S14        17   S2:S6 AND S13
S15        10   S14/2002-2005
S16         7   S14 NOT S15
S17        19   S2 AND S3:S6
S18         7   S17/2002-2005
S19        12   S17 NOT S18
S20        10   S19 NOT S16
S21    114464   (IIIB OR 3A OR IIIA OR III OR 3B)/TI,DE,ID
S22       980   S1:S20 AND S21
S23        71   S22 AND CAP??????
S24         0   S22 AND CAPP?????
S25         0   S22 AND CAP
S26         0   S22 AND CAPS
S27         6   S22 AND VERTICAL?
S28         2   S22 AND DOTS
S29         4   S22 AND WIRES
S30         0   S22 AND RODS
S31         2   S22 AND PILLARS
S32         5   S22 AND COLUMNS
S33        57   S22 AND NANO???????
S34         3   S22 AND MESO???????
S35        12   S22 AND NM
S36         7   S33:S35 AND S27:S32
S37         4   S36/2002-2005
S38         3   S36 NOT S37
S39       106   S1:S38 AND CAPP??????
S40       223   S1:S38 AND CAP
S41        20   S1:S38 AND CAPS
S42         8   S1:S38 AND COVER????(W)LAYER?
S43        21   S39:S42 AND (S1 OR INSULAT?)
S44         3   S43/2002-2005
S45        18   S43 NOT S44
S46    177277   (IIIB OR 3A OR IIIA OR III OR 3B)
S47        15   45AND46
S48         8   S45 AND (COMPOUND OR BINARY)(2W)SEMICOND?????????????
S49     19804   (VA OR VB OR 5A OR 5B)
S50         0   45AND49
S51        18   S45 OR S47 OR S48
S52         2   S51 AND (ELECTRONIC??)
S53         0   S51 AND (NANOELECTRONIC??)
S54         1   S51 AND (OPTOELECTRONIC??)
S55         3   S52 OR S54
S56         0   S51 AND (NANOP? OR MESOP?)
S57         0   S51 AND (PORE??????? OR POROUS? OR POROS?)
S58         1   S51 AND (NANOARRAY? OR ARRAY?)
S59         1   S1 AND SUPERLATTIC?
S60      1733   (S21 OR S46:S49) AND SUPERLATTIC?
S61         5   S60 AND NANOP?
S62         2   S60 AND MESOP?
S63         2   S60 AND MESOS?
```

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       19jan05 11:19:34 User259284 Session D3029.4
File 350:Derwent WPIX 1963-2005/UD,UM &UP=200504
       (c) 2005  Thomson Derwent

      Set  Items  Description
      ---  -----  -----------
      S1       5  PN=(US 5332681 OR US 5264722 OR US 6139626 OR US 6177291
                  OR US 20010019565 OR US 2001019565)
? map pn/ct=
Serial#SD764


-------------------------------------------------------------------------------

       19jan05 11:21:25 User259284 Session D3029.6
File 342:Derwent Patents Citation Indx 1978-04/200501
       (c) 2005 Thomson Derwent

      Set  Items  Description
      ---  -----  -----------
Executing SD764
      S1      54  Serial: SD764

? map pn

16 Select Statement(s), 203 Search Term(s)
Serial#SD765
-------------------------------------------------------------------------------
? b 350 347 344;ex
       19jan05 11:21:49 User259284 Session D3029.7
SYSTEM:OS  - DIALOG OneSearch
  File 350:Derwent WPIX 1963-2005/UD,UM &UP=200504          (c) 2005  Thomson Derwent
  File 347:JAPIO Nov 1976-2004/Aug(Updated 041203)          (c) 2004 JPO & JAPIO
  File 344:Chinese Patents Abs Aug 1985-2004/May            (c) 2004 European Patent Office

      Set  Items  Description
      ---  -----  -----------
Executing SD765
Set     Items   Description
S1         66   S1:S15
S2          1   S1 AND (CAP OR CAPP??????? OR CAPS)
S3          1   S1 AND (LID OR LIDS OR LIDD?????)
S4          7   S1 AND COVER????
S5          8   S2:S4
S6          3   PA=ULTRADOT?
S7          2   S6 NOT S5
S8          1   S1 AND (SECOND OR ANOTHER OR TOP?????)(2W)(III OR IIIA OR IIIB OR 3A OR 3B OR
COMPOUND OR SEMICOND???????? OR BINARY OR VA OR VB OR V)
S9          0   S1 AND 2ND(2W)(III OR IIIA OR IIIB OR 3A OR 3B OR COMPOUND OR SEMICOND???????? OR
BINARY OR VA OR VB OR V)
S10         4   S1 AND SEMICOND????????(2N)(III OR IIIA OR IIIB OR 3A OR 3B OR COMPOUND OR BINARY
OR VA OR VB OR V)
S11         2   S1 AND (III OR IIIA OR IIIB OR 3A OR 3B)(3N)(5A OR 5B OR VA OR VB OR V)
S12         5   S10:S11
S13        10   S5 OR S6
S14         3   S12 NOT S13
S15         0   S1 AND SUPERLATTIC?
S16        31   S1 AND ARRAY?
S17         0   S1 AND NANOARRAY?
S18        25   S16 NOT (S6 OR S5 OR S7 OR S14)
S19         5   S18 AND QUANTUM
S20         2   S18 AND NANOP?
S21         0   S18 AND MESOP?
S22         0   S18 AND MESOS?
S23         2   S18 AND NANOS?
S24         3   S20:S23
```

19jan05 11:32:25 User259284 Session D3029.9

SYSTEM:OS - DIALOG OneSearch
File 34:SciSearch(R) Cited Ref Sci 1990-2005/Jan W2
(c) 2005 Inst for Sci Info
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
(c) 1998 Inst for Sci Info

| Set | Items | Description |
|---|---|---|
| S1 | 9 | HIGHLY()ORDERED()PORES |
| S2 | 6 | S1/2002-2005 |
| S3 | 3 | S1 NOT S2 |
| S4 | 70 | CR='LI FY, 1998, V10, P2470, CHEM MATER':CR='LI FY, 1998, V10, P2473, J CHEM MAT' |
| S5 | 57 | S4/2002-2005 |
| S6 | 13 | S4 NOT S5 |
| S7 | 8 | S6/2001 |
| S8 | 5 | S6 NOT S7 |

L33 ANSWER 1 OF 23 WPIX **COPYRIGHT** THE THOMSON CORP on STN
AN 2004-633111 [61] WPIX Full-text
CR 2001-540886 [60]; 2002-239104 [29]; 2002-328205 [36]; 2002-328206 [36]; 2002-328347 [36]; 2002-403396 [43]; 2002-434695 [46]; 2002-478915 [51]; 2002-506816 [54]; 2002-566148 [60]; 2003-657149 [62]; 2004-623884 [60]; 2004-623885 [60]; 2004-623960 [60]; 2004-832798 [82]
DNN N2005-011715 DNC C2005-004257
TI Semiconductor structure for communicating device, comprises monocrystalline oxide material, and monocrystalline compound semiconductor material of first type formed overlying monocrystalline oxide material.
DC L03 U11
IN DROOPAD, R; EINSEBEISER, K W; HILT, L L; RAMDANI, J
PA (MOTI) MOTOROLA INC
CYC 1
PI US 2004150003 A1 20040805 (200461)* 26 H01L031-328
ADT US 2004150003 A1 Div ex US 2000-502023 20000210, Div ex US 2002-76450 20020219, US 2004-767996 20040202
FDT US 2004150003 A1 Div ex US 6392257
**PRAI** US 2000-502023 **20000210**; US 2002-76450 20020219; US 2004-767996 20040202
IC ICM H01L031-328
ICS H01L031-109; H01L031-336; H01L031-72
AB US2004150003 A UPAB: 20050107
NOVELTY - A semiconductor structure (72) comprises monocrystalline oxide material, and monocrystalline compound semiconductor material of first type formed overlying the monocrystalline oxide material.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for:
(A) a process for fabricating a semiconductor device structure comprising providing a monocrystalline semiconductor substrate (74) having silicon, epitaxially growing a monocrystalline **oxide layer** overlying the monocrystalline substrate, oxidizing the monocrystalline semiconductor substrate during the step of epitaxially growing to form a silicon **oxide layer** (80) between the monocrystalline semiconductor substrate and the monocrystalline **oxide layer**, and **epitaxially growing a monocrystalline compound semiconductor** layer overlying the monocrystalline **oxide layer**; and
(B) a communicating device comprising semiconductor structure.
USE - For use in communicating device (claimed).
ADVANTAGE - The invention provides a high quality monocrystalline compound semiconductor film over another monocrystalline material.
DESCRIPTION OF DRAWING(S) - The figure illustrates schematically in cross section a semiconductor structure.
Semiconductor structure 72
Monocrystalline semiconductor substrate 74
Silicon **oxide layer** 80
Intermediate layer 82
**Template** layer 84
First monocrystalline semiconductor layer 86
Second monocrystalline semiconductor layer 88 Dwg.5/18
TECH US 2004150003 A1UPTX: 20041203
TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Component: The semiconductor structure further includes **template** layer (84) formed between the monocrystalline oxide material and monocrystalline compound semiconductor material of first type, buffer layer of monocrystalline semiconductor material of second type formed between the monocrystalline oxide material and the monocrystalline compound semiconductor material of first type, and **template** layer formed between the monocrystalline oxide material and the buffer layer of monocrystalline semiconductor material of second type. The buffer layer comprises a monocrystalline semiconductor material from germanium, gallium arsenic-phosphide (GaAsxP1-x), **superlattice**, indium gallium phosphide (InyGa1-yP) **superlattice**, or indium gallium arsenide **superlattice** (InGaAs). The semiconductor structure further includes amorphous layer overlying the monocrystalline semiconductor substrate, first monocrystalline **oxide layer** overlying the amorphous layer, intermediate layer (82) having silicon oxide overlying the first region, second monocrystalline semiconductor layer (88) overlying the first monocrystalline **oxide layer**, second monocrystalline **oxide layer** overlying the first monocrystalline semiconductor layer (86), and third monocrystalline semiconductor layer overlying the second monocrystalline **oxide layer**. The communicating device further includes signal transceiving mechanism, and unit coupled to the semiconductor structure. Preferred Process: The fabrication of semiconductor structure further includes forming first **template** layer on the monocrystalline semiconductor substrate, and forming a second **template** layer overlying the monocrystalline **oxide layer**. The providing of monocrystalline semiconductor substrate includes providing a substrate having a silicon **oxide layer** on its surface.

The formation of first **template** layer includes depositing a material from barium or strontium into the silicon **oxide layer**, and heating the substrate to react the material with the silicon oxide. The epitaxial growing of monocrystalline **oxide layer** comprises heating the substrate to a temperature between 400-600degreesC, and introducing reactants having strontium, titanium, and oxygen. The formation of second **template** layer includes **capping** the monocrystalline **oxide layer** with a layer having monolayer of material from titanium, titanium and oxygen, strontium, or strontium and oxygen. The second **template** layer overlying the monocrystalline **oxide layer** is formed by depositing a layer having a thickness of 1-10 monolayers of material elected from zirconium arsenide, zirconium phosphide, hafnium arsenide, hafnium phosphide, strontium-oxygen-arsenide, strontium-oxygen-phosphide, strontium arsenide, strontium phosphide, barium oxygen arsenide, barium oxygen phosphide, barium arsenide, strontium gallium oxide, barium gallium oxide, or barium phosphide.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Component: The monocrystalline oxide material comprises an oxide from alkaline earth metal titanates, alkaline earth metal zirconates, alkaline earth metal hafnates, alkaline earth metal tantalates, alkaline earth metal ruthenates, alkaline earth metal niobates, alkaline earth metal vanadates, alkaline earth metal tin based perovskites, lanthanum aluminate, lanthanum scandium oxide, or gadolinium oxide. It comprises material comprises strontium barium titanate (SrzBa1-zTiO3 (z = 0-1)). The monocrystalline oxide material comprises a perovskite oxide. The monocrystalline compound semiconductor material comprises material from group **III-V** compounds, mixed **III-V** compounds, II-VI compounds, or mixed II-VI compounds. The monocrystalline compound semiconductor material comprises material from gallium arsenide, aluminum gallium arsenide, indium phosphide, indium gallium phosphide, zinc selenide, aluminum indium arsenide, cadmium sulfide, cadmium mercury telluride, or zinc selenium sulfide.
TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Component: The semiconductor structure further includes **template** layer (84) formed between the monocrystalline oxide material and monocrystalline compound semiconductor material of first type, buffer layer of monocrystalline semiconductor material of second type formed between the monocrystalline oxide material and the monocrystalline compound semiconductor material of first type, and **template** layer formed between the monocrystalline oxide material and the buffer layer of monocrystalline semiconductor material of second type. The buffer layer comprises a monocrystalline semiconductor material from germanium, gallium arsenic-phosphide (GaAsxP1-x), **superlattice**, indium gallium phosphide (InyGa1-yP) **superlattice**, or indium gallium arsenide **superlattice** (InGaAs). The semiconductor structure further includes amorphous layer overlying the monocrystalline semiconductor substrate, first monocrystalline **oxide layer** overlying the amorphous layer, intermediate layer (82) having silicon oxide overlying the first region, second monocrystalline semiconductor layer (88) overlying the first monocrystalline **oxide layer**, second monocrystalline **oxide layer** overlying the first monocrystalline semiconductor layer (86), and third monocrystalline semiconductor layer overlying the second monocrystalline **oxide layer**. The communicating device further includes signal transceiving mechanism, and unit coupled to the semiconductor structure.
Preferred Process: The fabrication of semiconductor structure further includes forming first **template** layer on the monocrystalline semiconductor substrate, and forming a second **template** layer overlying the monocrystalline **oxide layer**. The providing of monocrystalline semiconductor substrate includes providing a substrate having a silicon **oxide layer** on its surface.
The formation of first **template** layer includes depositing a material from barium or strontium into the silicon **oxide layer**, and heating the substrate to react the material with the silicon oxide. The epitaxial growing of monocrystalline **oxide layer** comprises heating the substrate to a temperature between 400-600degreesC, and introducing reactants having strontium, titanium, and oxygen. The formation of second **template** layer includes **capping** the monocrystalline **oxide layer** with a layer having monolayer of material from titanium, titanium and oxygen, strontium, or strontium and oxygen. The second **template** layer overlying the monocrystalline **oxide layer** is formed by depositing a layer having a thickness of 1-10 monolayers of material

elected from zirconium arsenide, zirconium phosphide, hafnium arsenide, hafnium phosphide, strontium-oxygen-arsenide, strontium-oxygen-phosphide, strontium arsenide, strontium phosphide, barium oxygen arsenide, barium oxygen phosphide, barium arsenide, strontium gallium oxide, barium gallium oxide, or barium phosphide.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Component: The monocrystalline oxide material comprises an oxide from alkaline earth metal titanates, alkaline earth metal zirconates, alkaline earth metal hafnates, alkaline earth metal tantalates, alkaline earth metal ruthenates, alkaline earth metal niobates, alkaline earth metal vanadates, alkaline earth metal tin based perovskites, lanthanum aluminate, lanthanum scandium oxide, or gadolinium oxide. It comprises material comprises strontium barium titanate (SrzBa1-zTiO3 (z = 0-1)). The monocrystalline oxide material comprises a perovskite oxide. The monocrystalline compound semiconductor material comprises material from group III-V compounds, mixed III-V compounds, II-VI compounds, or mixed II-VI compounds. The monocrystalline compound semiconductor material comprises material from gallium arsenide, aluminum gallium arsenide, indium phosphide, indium gallium phosphide, zinc selenide, aluminum indium arsenide, cadmium sulfide, cadmium mercury telluride, or zinc selenium sulfide.

FS CPI EPI
FA AB; GI
MC CPI: L04-C01; **L04-C12A; L04-E**
EPI: U11-C01J1; U11-C05B4

24/9/3 (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014837302
WPI Acc No: 2002-658008/200270
XRAM Acc No: C02-184804
XRPX Acc No: N02-520190
Three-dimensional **nanostructure** used, e.g., as a field emission source for a field emission display comprises substrate having a (semi)conductive surface and nanowire sets extending from the surface
Patent Assignee: UNIV MASSACHUSETTS (UYMA-N); BAL M (BALM-I); RUSSELL T P (RUSS-I); TUOMINEN M (TUOM-I); URSACHE A (URSA-I)
Inventor: BAL M; RUSSELL T P; TOUMINEN M T; URSACHE A; TUOMINEN M

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|---|---|---|---|---|---|---|
| WO 200273699 | A2 | 20020919 | WO 2002US7769 | A | 20020314 | 200270 B |
| US 20020158342 | A1 | 20021031 | US 2001275984 | P | 20010314 | 200274 |
| EP 1374310 | A2 | 20040102 | EP 2002725158 | A | 20020314 | 200409 |
| KR 2003087642 | A | 20031114 | KR 2003712051 | A | 20030915 | 200420 |
| AU 2002255741 | A1 | 20020924 | AU 2002255741 | A | 20020214 | 200433 |
| JP 2004527905 | W | 20040909 | JP 2002572644 | A | 20020314 | 200459 |

Priority Applications (No Type Date): **US 2001275984 P 20010314**; US 200298222 A 20020314
Abstract (Basic): **WO 200273699** A2

NOVELTY - Multilayer **nanostructure** comprises a substrate surface having at least a portion that is conductive or semiconductive; and at least one set of nanowires extending from the (semi)conductive surface. One end of the nanowires is in electrical communication with the (semi)conductive surface.

DETAILED DESCRIPTION - The nanowires have the same length of at least 20 nm, preferably 100 nm.

The substrate is lithographically patterned and has a number of independently (semi)conductive surface regions. At least one set of nanowires can be in electrical communication with the independently (semi)conductive surface regions. Similarly, at least some independently (semi)conductive surface regions can each be in electrical communication with an individual set of nanowires.

The multilayer **nanostructure** may further include at least one (semi)conductive layer that contacts an opposite end of at least some of the nanowires, and that is in electrical communication with at least some of the nanowires.

The (semi)conductive layer can be in electrical communication with at least some of the nanowires in a number of sets.

Some nanowires can be made of a material different from that of other sets.

The nanowires can differ in their reduction potential and their semi-metal type. At least some of the wires can comprise magnetic material and can be multilayered. At least some of the nanowires can be modified to have magnetic properties, including magnetization direction, distinct from those of other sets.

INDEPENDENT CLAIMS are given for:

(a) a field emission display device comprising an addressable **array** of field emitters comprising a multilayer **nanostructure** in which a (semi)conductive layer is in electrical communication with at least some of the nanowires in a number of sets, and a phosphorescent screen;

(b) a thermoelectric cooling device comprising a multilayer **nanostructure** in which nanowires differ in their semi-metal type, and are of n and p types;

(c) a magnetic data storage device comprising a multilayer **nanostructure** in which at least some sets of nanowires have are modified to have magnetic properties distinct from those of other sets, and where the nanowires have an aspect ratio of at least 20:1;

(d) a magneto-electronic device comprising a multilayer **nanostructure** in which a (semi)conductive layer is in electrical communication with at least some of the nanowires in a number of sets, and the nanowires comprise magnetic material;

(e) a method of interfacing an electrical connection with a multilayer **nanostructure**; and

(f) a magneto-transfer device consisting of a substrate surface comprising at least one electrode and an **array** of nanowires extending vertically from the surface in electrical communication with the electrode(s), where the **array** of nanowires is periodic on the tens of nanometer scale.

USE - Production of **nanoscale** devices, including field emission display devices, thermoelectric cooling devices, magnetic data

storage devices, magneto-electronic devices, and magneto-transfer devices (claimed).

ADVANTAGE - Extremely high density of magnetic cylinders in the new films offers the possibility of using the system in the next generation of magnetic storage devices and giant magneto resistance magnetic field sensing devices. The processes used to produce the **nanostructure** devices are parallel, scalable and not subject to speed limitations experienced in nanofabrication techniques based on serial writing.

DESCRIPTION OF DRAWING(S) - The drawing shows an exposure process used to create a **nanoporous array**, and subsequently can be used to create an **array** of nanowires.

pp; 64 DwgNo 1/22

Technology Focus:

TECHNOLOGY FOCUS - ELECTRONICS - Preferred Process: The method of interfacing an electrical connection with a multilayer **nanostructure** comprises:

(i) preparing a diblock copolymer on a substrate surface, at least a portion of which is (semi)conductive;

(ii) depositing a metal layer on at least a portion of the diblock copolymer layer;

(iii) orienting the diblock copolymer to form **nanoscopic** cylinders parallel to the each other and vertically oriented with respect to the surface;

(iv) removing at least a portion of one component from the oriented copolymer to form a patterned **array** of **nanopores** in the copolymer; and

(v) at least partially filling at least some of the **nanopores** with a material.

L33 ANSWER 19 OF 23 WPIX **COPYRIGHT** THE THOMSON CORP on STN
AN 1994-103763 [13] WPIX Full-text
CR 1996-436486 [44]; 1996-436488 [44]; 1996-445535 [45]; 1996-445536 [45]
DNN N1994-081032 DNC C1994-047686
TI Production of semiconductor device - by growing cpd. semiconductor **cap** layer, forming mask, immersing in ammonium sulphide solution, and etching.
DC L03 U11 U12 V08
IN HAYAFUJI, N; KIMURA, T; KIZUKI, H
PA (MITQ) MITSUBISHI DENKI KK; (MITQ) MITSUBISHI ELECTRIC CORP
CYC 3

| | | | | | |
|---|---|---|---|---|---|
| **PI** | **GB 2271466** | **A** | **19940413 (199413)*** | **131** | **H01L021-308** |
| | **JP 06232099** | **A** | **19940819 (199438)** | **38** | **H01L021-302** |
| | **GB 2271466** | **B** | **19970122 (199707)** | | **H01L021-308** |
| | JP 2001053391 | A | 20010223 (200115) | 33 | H01S005-343 |
| | US 6358316 | B1 | 20020319 (200224) | | C30B025-04 |
| | JP 2003347286 | A | 20031205 (200405) | 31 | H01L021-3065 |

PRAI JP 1993-44869 19930305; JP 1992-269610 19920910
IC ICM C30B025-04; H01L021-302; H01L021-3065; H01L021-308; H01S005-343
ICS C30B029-40; H01L021-205; H01L021-306; **H01L029-06**; H01L029-205; H01S003-18; H01S003-19; H01S005-10; H01S005-16
AB GB 2271466 A UPAB: 20040120
Production of semiconductor device comprises: (i) growing a cpd. semiconductor **cap** layer, including no Al on a cpd. semiconductor layer including Al; (ii) selectively forming a mask pattern comprising an **insulating film** on a part of the cpd. semiconductor **cap** layer; (iii) immersing the cpd. semiconductor wafer having the insulating mask pattern in an ammonium sulphide solution; (iv) selectively etching the cpd. semiconductor wafer using a Cl-containing gas in a reaction chamber; and (v) filling a groove formed in the etching process with a cpd. semiconductor layer grown in the reaction chamber by MOCVD. Also claimed are methods for producing a semiconductor laser and **quantum wire structures**, and an appts. for producing semiconductor devices.
ADVANTAGE - A regrowth interface with no impurities, such as oxygen and chlorine is attained, improving the quality of the regrown crystal layer.
Dwg.0/40
ABEQ GB 2271466 B UPAB: 19970212
A method for selectively epitaxially growing a **III-V** compound semiconductor layer on a substrate with an **insulating film** pattern by MOCVD wherein the epitaxial growth is carried out while supplying source gases and HCl gas or Cl2 gas at the same time under the condition that the molar flow rate of the HCl gas or Cl2 gas to the group III gas is lower than 0.3.

L118 ANSWER 20 OF 20 HCAPLUS **COPYRIGHT** ACS on STN
AN 1993:572062 HCAPLUS Full-text
DN 119:172062
ED Entered STN: 16 Oct 1993
TI Process for manufacture of **quantum** dot and **quantum** wire semiconductors
IN Moskovits, Martin
PA Can.
SO U.S., 7 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM H01L021-00
ICS H01L021-02; H01L021-20; H01L021-205
NCL 437233000
CC 76-3 (Electric Phenomena)
FAN.CNT 1

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| PI US 5202290 | A | 19930413 | US 1991-801404 | 19911202 |
| PRAI US 1991-801404 | | 19911202 | | |

CLASS

| PATENT NO. | CLASS | PATENT FAMILY CLASSIFICATION CODES |
|---|---|---|
| US 5202290 | ICM | H01L021-00 |
| | ICS | H01L021-02; H01L021-20; H01L021-205 |
| | NCL | 437233000 |

AB **Quantum** dot and **quantum** wire semiconductors, in the **nano** size range, are produced by a process which utilizes a microporous Al oxide surface layer on an Al metal substrate as a template for the semiconducting material. The microporous surface layer is prepared by **anodizing** an Al substrate in an acid bath. Then a metal capable of forming a semiconductor compound is electrodeposited into the surface micropores, the oxide is partially or wholly etched away, and the deposited metal is reacted with a liquid or gaseous reagent to convert it chemical to semiconducting compound There are produced **quantum** dot or **quantum** wire semiconductors in the form of an **array** of substantially mutually parallel, substantially uniform-sized rods of semiconductor material protruding from an elec. conductive substrate, each rod having a diameter <100 nm.

ST **quantum** dot wire semiconductor

IT Semiconductor devices
(**quantum** dot and wire, produced on aluminum substrate)

IT 144-62-7, Oxalic acid, uses 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses 7738-94-5, Chromic acid (H2CrO4)
RL: USES (Uses)
(**anodization** bath, for **quantum** dot or wire semiconductor manufacture)

IT 7440-43-9, Cadmium, uses 7440-55-3, Gallium, uses 7440-66-6, Zinc, uses 7440-74-6, Indium, uses
RL: USES (Uses)
(in **quantum** dot or wire semiconductor manufacture)

IT **1303-00-0**, Gallium arsenide, uses 1306-23-6, Cadmium sulfide, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(**quantum** dot or wire semiconductor devices)

IT 7429-90-5, Aluminum, uses
RL: USES (Uses)
(substrates, production of **quantum** dot and wire semiconductors on)

IT **1344-28-1**, Aluminum oxide, uses
RL: USES (Uses)
(surface layers, production of **quantum** dot and wire semiconductors on)

IT **1303-00-0**, Gallium arsenide, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(**quantum** dot or wire semiconductor devices)

L33 ANSWER 21 OF 23 WPIX **COPYRIGHT** THE THOMSON CORP on STN
AN 1992-383944 [47] WPIX Full-text
DNN N1992-292760 DNC C1992-170296
TI Fabrication of **quantum wire arrays** - by the formation of clusters of element converted to conductive cpd. semiconductor by ion implantation and annealing.
IN FUKUZAWA, T; MUNEKATA, H
PA (IBMC) INT BUSINESS MACHINES CORP; (IBMC) IBM CORP

| | | | | | |
|---|---|---|---|---|---|
| PI | EP 514100 | A2 19921119 (199247)* EN | 20 | | H01L025-00 |
| | US 5170226 | A 19921208 (199252) | 18 | | H01L027-12 |
| | BR 9201840 | A 19930105 (199305) | | | H01L021-28 |
| | CA 2066002 | A 19921118 (199306) | | | H01L021-20 |
| | JP 05136173 | A 19930601 (199326) | 13 | | H01L021-338 |
| | EP 514100 | A3 19930519 (199403) | | | H01L025-00 |
| | US 5281543 | A 19940125 (199405) | 18 | | H01L021-265 |
| | CA 2066002 | C 19960130 (199616) | | | H01L021-20 |

PRAI US 1991-701925 19910517

AB EP 514100 A UPAB: 19931116
Method comprises (a) depositing a layer of cpd. semiconductor such that it contains clusters of one of its elements and renders it highly resistive; (b) converting the crystal structure of the cpd. semiconductor layer in at least a discrete region of the layer to render it conductive.

Also claimed is (i) an electronic structure prepared using the method in claim (I); (ii) a device containing the structure; (iii) a method for fabricating a device with at least one FET with source and drain, gate and channel regions using the process as described in Claim (I) and (II).

ADVANTAGE - The process is especially suited to the fabrication of devices with short gate lengths.

ABEQ US 5170226 A UPAB: 19931006
The device comprises at least one cpd. semiconductor layer contg. clusters of one of the cpd. semiconductor elements of the layer which renders the layer resistive, and at least a discrete region of cpd. semiconductor free of the clusters and electrically conductive. The cpd. semiconductor is a **III-V** type or II-VI type and the cluster element is a Gp.V or Gp.VI element respectively. At least one cpd. semiconductor layer or discrete region is doped with a conductivity-type determining impurity. The region is a **quantum wire** or **dot**. An isolation layer is formed over the cpd. semiconductor layer and further covered with a **cap** layer.

ADVANTAGE - Enhanced device performance. (Dwg.2,3/1

ABEQ JP 05136173 A UPAB: 19931116

ABEQ US 5281543 A UPAB: 19940315
The method comprises (a) depositing a layer of cpd. semiconductor which contains clusters of one of the constituent elements which render the layer highly resistive, and (b) converting the crystalline structure of the layer in at least a discrete region of the layer to render the region conductive.

The deposition involves molecular beam epitaxy. The conversion involves ion implanting the other of the constituent elements into the discrete region, and annealing. The layer is a **III-V** or II-VI semiconductor e.g. GaAs or ZnSe. Opt. a conductivity-type determining impurity is simultaneously ion implanted.

USE/ADVANTAGE - Used in the mfr. of **quantum** structure, and improved FET structures with a gate length below 1 micron. Device performance is enhanced and mfr. is simplified.

L91 ANSWER 7 OF 9 HCAPLUS **COPYRIGHT** ACS on STN
AN 1996:238245 HCAPLUS Full-text
DN 124:302932
ED Entered STN: 23 Apr 1996
TI Assembling strained InAs islands on patterned GaAs substrates with chemical beam epitaxy
AU Jeppesen, Soren; Miller, Mark S.; Hessman, Dan; Kowalski, Bernhard; Maximov, Ivan; Samuelson, Lars
CS Dep. Solid State Physics, Lund University, Lund, S-221 00, Swed.
SO **Applied Physics Letters (1996)**, 68(16), 2228-30
CODEN: APPLAB; ISSN: 0003-6951
PB American Institute of Physics
DT Journal
LA English
CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76
AB The assembly of strained InAs islands was manipulated through growth on patterned GaAs substrates with chemical beam epitaxy. Conditions selectively place the islands in patterns features but not on surrounding unpatterned fields. **Chains of islands** having 33 nm min. periods were formed in trenches, and single or few islands were grown in **arrays of holes**. When capped with GaAs, the islands behave as quantum dots and are optically active.
ST strained arsenide island epitaxy patterned substrate; quantum dot cap indium arsenide island
IT Epitaxy
(mol.-beam, assembling strained InAs islands on patterned GaAs substrates by)
IT Semiconductor devices
(quantum dots, gallium arsenide capped strained InAs islands on patterned GaAs substrates grown by chemical beam epitaxy)
IT **1303-11-3**, Indium arsenide (InAs), processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(assembling strained InAs islands on patterned GaAs **substrates** with chemical beam epitaxy)
IT **1303-00-0**, Gallium arsenide (GaAs), processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(gallium arsenide **capped** strained InAs islands on patterned GaAs **substrates** grown by chemical beam epitaxy as quantum dots)
IT **1303-11-3**, Indium arsenide (InAs), processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(assembling strained InAs islands on patterned GaAs **substrates** with chemical beam epitaxy)
RN 1303-11-3 HCAPLUS
CN Indium arsenide (InAs) (8CI, 9CI) (CA INDEX NAME)


IT **1303-00-0**, Gallium arsenide (GaAs), processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(gallium arsenide **capped** strained InAs islands on patterned GaAs **substrates** grown by chemical beam epitaxy as quantum dots)
RN 1303-00-0 HCAPLUS
CN Gallium arsenide (GaAs) (8CI, 9CI) (CA INDEX NAME)

8/9/2 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


09198387 Genuine Article#: 377TW Number of References: 13
**Title**: Bimodal spatial distribution of pores in anodically oxidized aluminum thin films
Author(s): Behnke JF (REPRINT) ; Sands T
Corporate Source: UNIV CALIF BERKELEY,DEPT MAT SCI & ENGN/BERKELEY//CA/94720 (REPRINT)
**Journal**: JOURNAL OF APPLIED PHYSICS, 2000, V88, N11 (DEC 1), P6875-6880
ISSN: 0021-8979 **Publication Date**: 20001201
Publisher: AMER INST PHYSICS, 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501
Language: English Document Type: ARTICLE
Geographic Location: USA
Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences
Journal Subject Category: PHYSICS, APPLIED
**Abstract: Though porous anodic aluminum oxide has been the subject of considerable research since the 1950s,** little attention has been devoted to the characterization of the self-organization of the pore structures, and fewer of these studies have focused on anodization of thin films. The degree to which these structures self-organize, however, could play a vital role in future applications of porous anodic aluminum oxide. In this study a model is developed to describe pore ordering in thin anodized aluminum films. The model is based on a radial distribution function approach to describe the interpore spacings. Idealized one-dimensional and two-dimensional (2D) radial distribution functions are combined by linear superposition to approximate experimental radial distribution functions. Using these radial distribution functions, an order parameter is developed and an improved definition of pore spacing is constructed. This method confirms that the oxide initially forms with a highly frustrated porous structure and reorganizes toward greater 2D order as the oxide grows into the film. (C) 2000 American institute of Physics. [S0021-8979(00)07823-3].
Identifiers--KeyWord Plus(R): OXIDE
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WANG AW, 1995, 1995 IEEE ULTR S P
ZHANG ZB, 1999, V11, P1659, CHEM MATER

7/9/6 (Item 6 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


09563167 Genuine Article#: 420MF Number of References: 21
**Title**: Conditions for fabrication of ideally ordered anodic porous alumina using pretextured Al
Author(s): Asoh H (REPRINT) ; Nishio K; Nakao M; Tamamura T; Masuda H
Corporate Source: Tokyo Metropolitan Univ,Dept Appl Chem,Hachioji/Tokyo 1920397/Japan/ (REPRINT); Tokyo Metropolitan Univ,Dept Appl Chem,Hachioji/Tokyo 1920397/Japan/; NTT,Photon Lab,Atsugi/Kanagawa 24301/Japan/; NTT,Basic Res Lab,Atsugi/Kanagawa 24301/Japan/
**Journal**: JOURNAL OF THE ELECTROCHEMICAL SOCIETY, **2001**, V148, N4 (APR) , PB152-B156
ISSN: 0013-4651 **Publication Date**: 20010400
Publisher: ELECTROCHEMICAL SOC INC, 65 SOUTH MAIN STREET, PENNINGTON, NJ 08534 USA
Language: English Document Type: ARTICLE
Geographic Location: Japan
Journal Subject Category: ELECTROCHEMISTRY; MATERIALS SCIENCE, COATINGS & FILMS
**Abstract**: The conditions for the fabrication of ideally ordered anodic porous alumina with a high aspect ratio were examined using pretextured Al in oxalic acid solution. The obtained anodic porous alumina has a defect-free array of straight parallel channels perpendicular to the surface. Thr channel interval could be controlled by changing the interval of the pretextured pattern and the applied voltage. However, the depth at which perfect ordering could be maintained depended on the anodizing conditions, that is, the hole array with a high aspect ratio could be obtained only under thr appropriate anodizing voltage, which corresponded to that of the long-range ordering conditions in the oxalic acid solution. Under the most appropriate condition, ideally ordered channels with an aspect ratio of over 500 could be obtained. From these results, it was concluded that the long-range ordering conditions significantly influenced the growth of channels in anodic porous alumina even in/on the pretextured Al. (C) 2001 The Electrochemical Society. All rights reserved.
Identifiers--KeyWord Plus(R): ACID-SOLUTION; ARRAYS; PORES; OXIDE; FILMS; GOLD
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EBIHARA K, 1983, V34, P548, J MET FINISH SOC JPN
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LI AP, 1999, V11, P483, ADV MATER
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MASUDA H, 1996, V35, PL126, JPN J APPL PHYS 2
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MASUDA H, 1997, V71, P2770, APPL PHYS LETT
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MASUDA H, 1995, V268, P1466, SCIENCE
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57/9/1
DIALOG(R)File 2:INSPEC


7255540 INSPEC Abstract Number: A2002-12-4280S-002, B2002-06-6260M-033
**Title**: Dry etching and **nanofabrication** technology perspective for novel optical devices/components
Author(s): Asakawa, K.; Sugimoto, Y.
Author Affiliation: Femtosecond Technol. Res. Assoc. (FESTA), Tsukuba, Japan
**Journal**: Proceedings of the SPIE - The International Society for Optical Engineering **Conference Title**: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.4532 p.300-13
Publisher: SPIE-Int. Soc. Opt. Eng,
**Publication Date**: 2001 Country of Publication: USA
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(2001)4532L.300:ENTP;1-N
Material Identity Number: C574-2001-340
U.S. Copyright Clearance Center Code: 0277-786X/01/$15.00
**Conference Title**: Active and Passive Optical Components for WDM Communication
Conference Sponsor: SPIE
Conference Date: 21-24 Aug. 2001 Conference Location: Denver, CO, USA
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: General, Review (G); Practical (P); Experimental (X)
**Abstract**: This paper reviews **III-V** semiconductor dry etching **technologies established in the past decade** for miniaturizing and integrating photonic devices/components and **nano** -fabrication technologies under development for creating novel photonic structures such as photonic crystals and **quantum dots** . After briefing the technology requirements for DWDM/OTDM based Terabit optical communication era in 2005-2010, advancement of the GaAs- and InP-based smooth and high-aspect-ratio dry etching with mu m-size is reviewed with some applications to dry-etched laser diodes and waveguide devices. Secondly, electron beam **nano**-lithography and dry etching technologies for 10- to 100-nm-size structures are reviewed for demonstrating photonic crystals. Challenging application to extremely miniaturized waveguide-based planar light wave circuits is included. Lastly, **nano** -probe assisted processing of **arrayed quantum dots** as a 10-nm-size structure is discussed. Achievement of suppressed size fluctuation using this technology will provide us with a possibility of large optical nonlinearity (X/sup 3/) promising for all-optical switching devices in the OTDM optical communication network system. (27 Refs)
Subfile: A B
**Descriptors**: electron beam lithography; etching; **integrated optoelectronics**; **micro-optics**; nanotechnology; nonlinear optics; optical communication equipment; optical planar waveguides; optical switches; photonic band gap; **semiconductor quantum dots**; **time division multiplexing**; **wave**length division multiplexing
**Identifiers**: dry etching; **nanofabrication** technology; optical components; **III-V** semiconductor dry etching technologies; photonic devices; photonic structures; photonic crystals; **quantum dots**; DWDM; TDM; Terabit optical communication; GaAs-based smooth etching; high-aspect ratio dry etching; dry-etched laser diodes; waveguide devices; EB **nano**-lithography; dry etching technologies; miniaturized waveguide-based planar light wave circuits; **nano**-probe assisted processing; electron beam **nano**-lithography; **arrayed quantum dots**; suppressed size fluctuation; large optical nonlinearity; all-optical switching devices; OTDM optical communication network system; 100 nm; 10 nm; GaAs; InP
**Class Codes**: A4280S (Optical communication devices); A4265P (Optical bistability, multistability and switching); A4282 (Integrated optics); A4280L (Optical waveguides and couplers); A7865K (Optical properties of II-VI and III-V semiconductors (thin films/low-dimensional structures)); A7820P (Photonic band gap (condensed matter)); A4270Q (Photonic bandgap materials); A4250 (Quantum optics); A4283 (Micro-optical devices and

16/9/12
DIALOG(R)File 2:INSPEC


5249099 INSPEC Abstract Number: A9610-8115L-043, B9606-0520-006
**Title**: Electrochemical fabrication of metal and semiconductor nano-wire **arrays**
Author(s): Al Mawlawi, D.; Douketis, C.; Bigioni, T.; Moskovits, M.; Routkevitch, D.; Ryan, L.; Haslett, T.; Williams, A.; Jing Ming Xu
Author Affiliation: Dept. of Chem., Toronto Univ., Ont., Canada
**Conference Title**: Proceedings of the Symposium on Nanostructured Materials in Electrochemistry p.262-70
Editor(s): Searson, P.C.; Meyer, G.J.
Publisher: Electrochem. Soc, Pennington, NJ, USA
**Publication Date**: 1995 Country of Publication: USA ix+279 pp.
Material Identity Number: XX95-02969
**Conference Title**: Proceedings of Nanostructured Materials in Electrochemistry
Conference Date: 21-26 May 1995 Conference Location: Reno, NV, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P); Experimental (X)
**Abstract**: A technique is described for fabricating **arrays** of uniform metal (Ni, Fe) or semiconductor (CdS, other A/sup II/B/sup VI/, and GaAs) **nano-wires** with lengths up to 1 mu m and diameters as small as 8 nm, by electrochemically **depositing the metal or semiconductor into the pores of anodic aluminum oxide films**. Effects related to anisotropy, to electron confinement and to other consequences of their very small dimensions were observed for samples prepared from these nano-wire **arrays** . These include: (i) anisotropic resonance Raman spectra (RRS) of the CdS nano-wire arrays using light polarized along and perpendicular to the wires, (ii) size-dependent band gap energies calculated from the RRS, (iii) stepped current-voltage curves suggesting Coulomb blockade effects, (iv) highly anisotropic coercivity of ferromagnetic nano-wires which depended dramatically on their length-diameter ratio. Template-induced structural features of CdS nano-wires are also discussed. (20 Refs)
Subfile: A B
**Descriptors**: cadmium compounds; electrodeposits; gallium arsenide; II-VI semiconductors; **III-V** semiconductors; iron; nanostructured materials; nickel; Raman spectra; semiconductor growth; semiconductor **quantum wires**
**Identifiers**: semiconductor nano-wire **arrays**; metal nano-wire **arrays**; electrochemical deposition; anodic **aluminum** oxide films ; electron confinement; anisotropy; very small dimensions; anisotropic resonance Raman spectra; stepped current-voltage curves; Coulomb blockade effects; highly anisotropic coercivity; ferromagnetic nano-wires; length-diameter ratio; template-induced structural features; Ni; Fe; CdS; GaAs
**Class Codes**: A8115L (Deposition from liquid phases (melts and solutions)) ; A6855 (Thin film growth, structure, and epitaxy); **A7320D** (Electron states in low-dimensional structures); A7340L ( Semiconductor-to-semiconductor contacts, p-n junctions, and heterojunctions ); A7830G (Infrared and Raman spectra in inorganic crystals); A7830E ( Infrared and Raman spectra in metals); A7280E (Conductivity of III-V and II-VI semiconductors); A7340J (Metal-to-metal contacts); B0520 (Thin film growth); B2520D (II-VI and III-V semiconductors
**Chemical Indexing**:
Ni el (Elements - 1)
Fe el (Elements - 1)
CdS bin - Cd bin - S bin (Elements - 2)
GaAs bin - As bin - Ga bin (Elements - 2)

L84 ANSWER 20 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:896994 HCAPLUS Full-text
DN 136:174449
ED Entered STN: 13 Dec 2001
TI Electrochemical fabrication of **ordered Bi2S3 nanowire arrays**
AU Peng, X. S.; Meng, G. W.; Zhang, J.; Zhao, L. X.; Wang, X. F.; Wang, Y. W.; Zhang, L. D.
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
SO **Journal of Physics D: Applied Physics (2001)**, 34(22), 3224-3228
CODEN: JPAPBE; ISSN: 0022-3727
PB Institute of Physics Publishing
DT Journal
LA English
CC 72-2 (Electrochemistry)
Section cross-reference(s): 66, 73, 75, 76
AB The authors have successfully fabricated ordered, well-crystallized Bi2S3 nanowire **arrays** embedded in the nanochannels of porous **anodic aluminum** oxide templates by d.c. electrodeposition from a DMSO solution containing BiCl3 and elemental sulfur. X-ray diffraction and selected area electron diffraction studies demonstrate that the Bi2S3 nanowires have an orthorhombic uniform structure. Electron microscopy results show that the nanowires are quite ordered with diams. of .apprx.40 nm and lengths up to 5 μm. X-ray energy dispersion anal. indicates that the atomic composition of Bi and S is very close to a 2:3 stoichiometry. The optical properties of these nanowires were characterized by optical absorption techniques. These studies reveal that the annealed Bi2S3 nanowires have an optical band edge (direct) of .apprx.1.56 eV.
ST electrochem fabrication ordered bismuth sulfide nanowire **array**
IT Electrodeposition
**Quantum** wire devices
(electrochem. fabrication of ordered Bi2S3 nanowire **arrays** embedded in nanochannels of porous **anodic aluminum** oxide templates by d.c. electrodeposition from DMSO bath containing BiCl3 and elemental sulfur)
IT Crystallization
(electrocrystallization; electrochem. fabrication of ordered Bi2S3 nanowire **arrays** embedded in nanochannels of porous **anodic aluminum** oxide templates by d.c. electrodeposition from DMSO bath containing BiCl3 and elemental sulfur)
IT X-ray spectroscopy
(energy-dispersive; of Bi2S3 ordered nanowire electrodeposits)
IT Electrodeposits
(morphol. of Bi2S3 ordered nanowire)
IT Absorption spectra
Surface structure
(of Bi2S3 ordered nanowire electrodeposits)
IT Band gap
(optical; of Bi2S3 ordered nanowire electrodeposits)
IT 1345-07-9, Bismuth sulfide (Bi2S3)
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(electrochem. fabrication of ordered Bi2S3 nanowire **arrays** embedded in nanochannels of porous **anodic aluminum** oxide templates by d.c. electrodeposition from DMSO bath containing BiCl3 and elemental sulfur)
IT **1344-28-1**, Aluminum oxide, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(electrochem. fabrication of ordered Bi2S3 nanowire **arrays** embedded in nanochannels of porous **anodic aluminum** oxide templates by d.c. electrodeposition from DMSO bath containing BiCl3 and elemental sulfur)
IT 7704-34-9, Sulfur, reactions 7787-60-2, Bismuth chloride (BiCl3)
RL: RCT (Reactant); RACT (Reactant or reagent)
(electrochem. fabrication of ordered Bi2S3 nanowire **arrays**

20/9/10 (Item 3 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online


01448753 ORDER NO: AADAA-I9540627
# ELECTROCHEMICALLY SYNTHESIZED NANOSTRUCTURES ON ALUMINUM

Author: YUE, DUOFENG
Degree: PH.D.
**Year: 1995**
Corporate Source/Institution: UNIVERSITY OF NOTRE DAME (0165)
Director: ALBERT E. MILLER
Source: VOLUME 56/07-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 3970. 156 PAGES
**Descriptors**: ENGINEERING, MATERIALS SCIENCE
Descriptor Codes: 0794

The conventional route to **nanosynthesis** involves beam lithography which causes significant crystallographic damage to processed nanostructures. To circumvent this problem, a "gentle" electrochemical technique for synthesizing **quantum** dot arrays has been developed. It involves **anodization** of an **aluminum** substrate to produce a porous template on the surface with a hexagonal quasi periodic arrangement of **nanopores**. Materials are electrodeposited within the pores to create regimented array of **quantum** dots. In this work, the effects of different pre-treatments of raw materials and different anodization parameters change on film quality have been investigated. The dependence of pore size, shape, size variation and regimentation on the surface features has been ascertained. A general pore nucleation and growth model is proposed based on the observation of pore development processes by TEM, FESEM and AFM. Finally, **nanoparticles** are successfully electrodeposited into these **nanopores** with sizes and shapes under control.

L84 ANSWER 27 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:35076 HCAPLUS Full-text
DN 134:214107
ED Entered STN: 15 Jan 2001
TI Electrodeposition of CoSb3 **nanowires**
AU Behnke, J. F.; Prieto, A. L.; Stacy, A. M.; Sands, T.
CS Department of Materials Science and Mineral Engineering, University of California, Berkeley, CA, 94720, USA
SO **International Conference on Thermoelectrics (1999)**, 18th, 451-453
CODEN: ICTNBZ; ISSN: 1094-2734
PB Institute of Electrical and Electronics Engineers
DT Journal
LA English
CC 72-8 (Electrochemistry)
Section cross-reference(s): 56, 76
AB Materials with the skutterudite crystal structure, such as CoSb3, are promising in the development of high figure-of-merit thermoelec. materials. Theor. studies showed that **quantum** confinement may produce enhancements in the figure-of-merit. Calcns. based on the Kubakaddi model for thermopower of a **nanowire** showed that **nanowires** of CoSb3 should produce this enhancement at larger wire diams. than other candidate materials, such as Bi2Te3. This study used pulse plating followed by a post anneal treatment to fabricate CoSb3 electrochem. from a citrate bath. Initial attempts were also made to deposit cobalt and antimony into a porous **anodic aluminum** oxide matrix. Porous **anodic aluminum** oxide was chosen as a host material because of its relatively uniform pore diameter and spacing, its **vertical** walled test tube shape, and the high barrier to tunneling that the aluminum oxide provides.
ST pulsed electrodeposition cobalt antimony **nanowire**; **anodic alumina** pulsed electrodeposition cobalt antimony **nanowire**
IT Electrodeposits
(annealing of antimony-cobalt alloy)
IT Annealing
(antimony-cobalt alloy **nanowires**)
IT Electrodeposition
(pulse; of cobalt-antimony **nanowires**)
IT **Nanowires** (metallic)
(pulsed electrodeposition of cobalt-antimony **nanowires**)
IT 12187-20-1
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(pulsed electrodeposition of CoSb3 **nanowires**)
IT 77-92-9, Citric acid, uses 866-84-2, Potassium citrate
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(pulsed electrodeposition of cobalt-antimony **nanowires** in bath containing co sulfate and antimony oxide and citric acid and potassium citrate)
IT **1344-28-1**, Alumina, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(pulsed electrodeposition of cobalt-antimony **nanowires** using **anodic**)
IT 208583-99-7, Antimony 75, cobalt 25 (atomic)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(pulsed electrodeposition of **nanowires** of)
RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anno, H; Proc 15th International Conference on Thermoelectrics 1996, P435 HCAPLUS
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IT **1344-28-1**, Alumina, uses

16/9/4 (Item 1 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online


01874743 ORDER NO: AADAA-I3044637
Electrodeposition of nanostructured thermoelectric materials
Author: Prieto, Amy Lucia
Degree: Ph.D.
**Year: 2001**
Corporate Source/Institution: University of California, Berkeley (0028)
Chair: Angelica M. Stacy
Source: VOLUME 63/02-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 798. 198 PAGES
**Descriptors:** CHEMISTRY, INORGANIC ; ENGINEERING, ELECTRONICS AND ELECTRICAL
Descriptor Codes: 0488; 0544
ISBN: 0-493-58516-8

Dimensionally restricted materials present a wide range of potential applications ranging from thermoelectric power generation to information storage and processing. In particular, **nanowires** are promising materials for thermoelectric applications because **quantum** confinement has been shown to increase thermoelectric efficiency. This dissertation describes the fabrication of thick films and **nanowires** of Bi<sub>2</sub>Te<sub>3</sub>, CoSb<sub>3</sub>, and Bi<sub>1−x </sub>Sb<sub>x</sub>, all thermoelectric materials of current interest.

Electrochemical deposition into porous **anodic alumina** templates was used to fabricate nanowires of three different thermoelectric materials. Electrodeposition of material into the pores of the templates ensures that the as-deposited wires are electrically continuous, and provides a wide range of control via anodization potentials, electrolytes, and temperature. Characterization of the **nanowire**/porous A1203 composite materials was accomplished using X-Ray diffraction (XRD) to determine the phase, degree of crystallinity, and orientation of the **nanowires**. Scanning electron microscopy (SEM) and transmission electron microscopy (TEM) in conjunction with energy dispersive spectroscopy (EDS) were used to determine the extent of **pore-filling**, the morphology of the wires, and the composition of the wires.

High quality Bi<sub>2</sub>Te<sub>3</sub> wires with 200 nm and 40 nm average diameters were obtained by direct electrodeposition. A high degree of pore filling was accomplished by minimizing the rate of growth by using 0.03 **V** vs. Ag/AgCl as the deposition potential, Ag as an electrode material, and ∼50 μm thick templates. Nucleation in 95% of the pores in a 4-cm<super> 2</super> sample was achieved. The wires are crystalline, dense, and highly textured along the optimal growth direction for thermoelectric properties.

Polycrystalline CoSb<sub>3</sub> films have been electrodeposited from an aqueous solution of CoSO<sub>4</sub>, Sb<sub>2</sub>O<sub>3</sub>, potassium citrate, and citric acid. The conditions used to deposit the films could not be used to make **nanowires**. A multilayered method involving the deposition of layers of the elements followed by post-annealing was developed in order to fabricate **nanowires** of crystalline CoSb<sub>3</sub> with **three**-dimensional periodicity.

The electrodeposition of films, 200 nm and 50 nm wires of Bi<sub>1−x </sub>Sb<sub>x</sub> has been accomplished. Phase separation occurs under rapid growth conditions for the films, and for the wires even at low Sb compositions. The wires do not fill the pores completely, but are continuous, dense and of uniform diameter.

7/9/4 (Item 4 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


09611145 Genuine Article#: 427ZX Number of References: 16
**Title: Electrodeposition of highly uniform magnetic nanoparticle arrays in ordered alumite**
Author(s): Sun M; Zangari G (REPRINT) ; Shamsuzzoha M; Metzger RM
Corporate Source: Univ Alabama,Ctr Mat Informat Technol,Tuscaloosa//AL/35487 (REPRINT); Univ Alabama,Ctr Mat Informat Technol,Tuscaloosa//AL/35487
**Journal**: APPLIED PHYSICS LETTERS, **2001**, V78, N19 (MAY 7), P2964-2966
ISSN: 0003-6951 **Publication Date**: 20010507
Publisher: AMER INST PHYSICS, 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA
Language: English Document Type: ARTICLE
Geographic Location: USA
Journal Subject Category: PHYSICS, APPLIED
**Abstract**: We report the fabrication of nanometer scale ordered arrays of magnetic cylindrical nanoparticles with low aspect ratio (height/radius a = 0.2-7) and ultrahigh uniformity. Anodization and electrochemical deposition are employed for template synthesis and metal particle growth, respectively. Particle uniformity is achieved by an electrodeposition scheme, utilizing pulse reverse voltage wave forms to control nucleation and growth of the particles. The resulting nanoparticles are polycrystalline and grains are randomly oriented. The magnetic properties of the array are dominated by particle shape and by interparticle magnetostatic interactions. A very clear transition of the anisotropy from perpendicular to in plane is observed at an aspect ratio a of about two. The arrays exhibit good thermal stability, demonstrating a great potential of these structures as future recording media in a patterned scheme. The pulse reverse electrodeposition technique shows great promise for the synthesis of nanostructures of various nature. (C) 2001 American Institute of Physics.
Identifiers--KeyWord Plus(R): PATTERNED MEDIA; ANODIC ALUMINA; DENSITY; STORAGE; PORES
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LI AP, 2000, V3, P131, ELECTROCHEM SOLID ST
LI FY, 1998, V10, P2470, CHEM MATER
MASUDA H, 1995, V268, P1466, SCIENCE
MASUDA H, 1997, V71, P2770, APPL PHYS LETT
METZGER RM, 2000, V36, P30, IEEE T MAGN 1
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ROSS CA, 1999, V17, P3168, J VAC SCI TECHNOL B
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WELLER D, 1999, V35, P4423, IEEE T MAGN
WHITE RL, 1997, V33, P990, IEEE T MAGN 2

L84 ANSWER 32 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2000:58298 HCAPLUS Full-text
DN 132:188464
ED Entered STN: 25 Jan 2000
TI Electronic bistability in electrochemically self-assembled **quantum** dots A potential nonvolatile random access memory
AU Kouklin, N.; Bandyopadhyay, S.; Tereshin, S.; Varfolomeev, A.; Zaretsky, D.
CS Department of Electrical Engineering, University of Nebraska, Lincoln, NE, 68588-0511, USA
SO **Applied Physics Letters (2000)**, 76(4), 460-462
CODEN: APPLAB; ISSN: 0003-6951
PB American Institute of Physics
DT Journal
LA English
CC 76-14 (Electric Phenomena)
AB An electronic bistability was observed in a two-dimensional spatially ordered array of 10 nm **quantum** dots self-assembled by electrodepositing CdS in **nanoporous anodic** alumite film. The current-voltage characteristic of the array shows switching between two stable conductance states, which can be controlled by an external bias. The bistability is observed when current flows laterally between two contacts on the top surface of the array, and also when current flows **vertically** between a top contact and the bottom (conducting) substrate. If the system is left in one conductance state, it remains there for at least 180 h and possibly much longer, until switched to the other state by an external bias. Such an effect may find applications in inexpensive, ultradense nonvolatile static random access memory.
ST electrochem self assembled **quantum** dot RAM memory
IT Memory devices
(RAM (random access); electronic bistability in electrochem. self-assembled **quantum** dots, a potential nonvolatile random access memory)
IT Electric conductivity
Electric current-potential relationship
**Quantum** dot devices
(electronic bistability in electrochem. self-assembled **quantum** dots, a potential nonvolatile random access memory)
IT 1306-23-6, Cadmium sulfide (CdS), properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(electronic bistability in electrochem. self-assembled **quantum** dots, a potential nonvolatile random access memory)
IT **1344-28-1**, Alumite, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(electronic bistability in electrochem. self-assembled **quantum** dots, a potential nonvolatile random access memory)
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) AlMawlawi, D; J Appl Phys 1991, V70, P4421 HCAPLUS
(2) Balandin, A; Phys Low-Dimens Semicond Struct 1997, V11/12, P155
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(6) Ovshinsky, S; Phys Rev Lett 1968, V21, P1450
(7) Routkevich, D; J Phys Chem 1996, V100, P14037
IT **1344-28-1**, Alumite, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(electronic bistability in electrochem. self-assembled **quantum** dots, a potential nonvolatile random access memory)
RN 1344-28-1 HCAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

16/9/5 (Item 2 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online


01844037 ORDER NO: AADAA-I3019791
Fabrication and assessment of structure, composition, and electronic properties of **nanowire arrays**
Author: Sander, Melissa
Degree: Ph.D.
**Year: 2001**
Corporate Source/Institution: University of California, Berkeley (0028)
Co-Chairs: Ronald Gronsky; Angelica M. Stacy
Source: VOLUME 62/07-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 3213. 105 PAGES
**Descriptors:** CHEMISTRY, PHYSICAL ; ENGINEERING, MATERIALS SCIENCE
Descriptor Codes: 0494; 0794
ISBN: 0-493-31015-0

Nanocomposite materials consisting of **arrays of parallel, uniform-diameter nanowires within a supporting matrix** have a variety of potential applications. The focus of this work is on two **nanowire** array systems, bismuth and bismuth telluride nanowires in alumina templates. These systems are both promising for thermoelectric applications due to an expected increase in thermoelectric efficiency with reduced dimensionality.

Bismuth telluride nanowire arrays were fabricated by electrochemical deposition of Bi<sub>2</sub>Te<sub>3</sub> into porous **anodic alumina templates**. A process has been developed that allows for the production of high density (∼5 × 10<super>9</super>/cm<super>2</super>), high aspect-ratio (>1000), ordered nanowire arrays over large areas (>1mm<super>2</super>), which will enable routine assessment of the array properties as well as potential incorporation into existing device structures. High spatial resolution characterization techniques, including imaging, diffraction, and energy-dispersive spectroscopy in the transmission electron microscope (TEM), have been employed to assess the structure and composition in the arrays. The nanowires are dense, polycrystalline Bi<sub>2</sub>Te<sub>3</sub> with strong texturing along the wire axis. A short (<5 μm) Te-rich composition gradient was identified at the base of the pores.

In addition, the composition, structure, and electronic properties of pressure-injected bismuth nanowire arrays have been assessed at high spatial resolution by employing imaging, diffraction, and electron energy loss spectrometry (EELS) in the TEM. The nanowires are polycrystalline with high aspect-ratio grains, and there is evidence of internal localized strain fields. The Bi-Al<sub> 2</sub>O<sub>3</sub> interface in the arrays is compositionally abrupt, with a narrow interphase region dominated by Bi-O bonding. Low-loss EELS studies indicate that the volume plasmon loss peak in individual Bi nanowires shifts to higher energy and broadens as the wire diameter decreases from 90 to 35nm. A low-loss excitation is present in spectra from the Bi-Al<sub>2</sub>O<sub> 3</sub> interface that is consistent with an interfacial plasmon excitation. Energy-filtered imaging reveals that the excitation is strongly localized at the interface.

This investigation reveals that nanowire arrays represent a promising path forward for thermoelectric and other potential applications. These results enable an understanding of the relationship between fabrication parameters and the local structure, composition, and electronic excitations in nanowire arrays and will allow for correlation of this information with nanowire array properties.

L118 ANSWER 14 OF 20 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:701227 HCAPLUS Full-text
DN 136:12163
ED Entered STN: 26 Sep 2001
TI Fabrication and photoluminescence of ordered GaN **nanowire arrays**
AU Zhang, J.; Zhang, L. D.; Wang, X. F.; Liang, C. H.; Peng, X. S.; Wang, Y. W.
CS Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, 230031, Peop. Rep. China
SO Journal of Chemical Physics (2001), 115(13), 5714-5717
CODEN: JCPSA6; ISSN: 0021-9606
PB American Institute of Physics
DT Journal
LA English
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
AB Large-scale of crystalline GaN **nanowires** (diameter .apprx.50 nm) were fabricated through CVD in the **nanochannels** of the **anodic alumina** template. X-ray diffraction and selected area electron diffraction pattern studies indicate that the **nanowires** are single crystal with hexagonal wurtzite structure. A typical SEM image and the energy dispersive x-ray spectroscopy results indicate that In **nanoparticles** only act as catalyst in GaN **nanowires** growth. At room temperature, luminescence of the GaN **nanowire arrays** shows a visible broadband with 3 peaks, which are located at .apprx.363, 442, and 544 nm. The light emission may be attributed to GaN band-edge emission, the existence of defects or surface states, and the interaction between the ordered GaN **nanowires** and **anodic alumina** membrane. The growth mechanism of crystalline GaN **nanowires** is discussed. The method makes it possible to synthesize other nitride **nanowire arrays**.
ST gallium nitride **nanowire** fabrication luminescence
IT X-ray spectra
(energy-dispersive; of gallium nitride ordered **nanowire arrays**)
IT **Nanostructures**
(fabrication and luminescence of gallium nitride ordered **nanowire arrays**)
IT **Nanoparticles**
(indium catalyst in gallium nitride ordered **nanowire** growth)
IT Catalysts
(indium **nanoparticles** in gallium nitride ordered **nanowire** growth)
IT Atomic force microscopy
Electron diffraction
Luminescence
Scanning electron microscopy
Transmission electron microscopy
X-ray diffraction
(of gallium nitride ordered **nanowire arrays**)
IT **25617-97-4**, Gallium nitride
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(fabrication and luminescence of ordered **nanowire arrays**)
IT 7440-74-6, Indium, uses
RL: CAT (Catalyst use); USES (Uses)
(**nanoparticles**; catalyst in gallium nitride ordered **nanowire** growth)
RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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(6) Duan, X; J Am Chem Soc 2000, V122, P188 HCAPLUS
(7) Frosch, C; J Phys Chem 1958, V62, P611

L84 ANSWER 22 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:663997 HCAPLUS Full-text
DN 135:364973
ED Entered STN: 12 Sep 2001
TI Fabrication and Structural Characterization of Large-Scale Uniform SnO2 Nanowire **Array** Embedded in **Anodic Alumina** Membrane
AU Zheng, Maojun; Li, Guanghai; Zhang, Xinyi; Huang, Shiyong; Lei, Yong; Zhang, Lide
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
**SO** **Chemistry of Materials (2001), 13(11), 3859-3861**
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English
CC 76-3 (Electric Phenomena)
AB Semiconductor SnO2 nanowire **arrays** were fabricated by electrochem. deposition and thermal oxidizing methods based on highly ordered nanoporous alumina membrane. Their microstructures were characterized by x-ray diffraction, TEM, Raman spectrum, and SEM. The results indicate that the SnO2 nanowire **array** with cassiterite polycryst. structure is uniformly assembled into the hexagonally ordered nanochannels of **anodic alumina** membranes. There are three phases (Sn, SnO, and SnO2) coexisting when the as-deposited assembly system is annealed at 823 K, However, only the SnO2 cassiterite phase is detected when the assembly system is annealed at 923 K.
ST tin oxide nanowire **anodized alumina** membrane
IT Annealing
**Anodization**
Electrodeposition
Membranes, nonbiological
**Quantum** wire devices
Raman spectra
(fabrication and Structural Characterization of Large-Scale Uniform tin oxide Nanowire **Array** Embedded in **Anodic Alumina** Membrane)
IT Oxidation
(thermal; fabrication and Structural Characterization of Large-Scale Uniform tin oxide Nanowire **Array** Embedded in **Anodic Alumina** Membrane)
IT 21651-19-4, Tin oxide (SnO)
RL: FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); FORM (Formation, nonpreparative); PROC (Process)
(fabrication and Structural Characterization of Large-Scale Uniform tin oxide Nanowire **Array** Embedded in **Anodic Alumina** Membrane)
IT 7440-31-5P, Tin, processes
RL: PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(fabrication and Structural Characterization of Large-Scale Uniform tin oxide Nanowire **Array** Embedded in **Anodic Alumina** Membrane)
IT 18282-10-5P, Tin oxide (SnO2)
RL: PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(fabrication and Structural Characterization of Large-Scale Uniform tin oxide Nanowire **Array** Embedded in **Anodic Alumina** Membrane)
IT **1344-28-1**, Alumina, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fabrication and Structural Characterization of Large-Scale Uniform tin oxide Nanowire **Array** Embedded in **Anodic Alumina** Membrane)
IT 7429-90-5, Aluminum, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(fabrication and Structural Characterization of Large-Scale Uniform tin

01715472 ORDER NO: AADAA-I0800704

Fabrication, characterization and transport properties of bismuth **nanowire** systems

Author: Zhang, Zhibo
Degree: Ph.D.
Year: 1999
Corporate Source/Institution: Massachusetts Institute of Technology ( 0753)
Supervisors: Mildred S. Dresselhaus; Jackie Y. Ying
Source: VOLUME 60/10-B OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 5125.
**Descriptors**: PHYSICS, CONDENSED MATTER
Descriptor Codes: 0611

Low-dimensional systems represent one of the important frontiers in solid state physics research. In this thesis, I developed a novel fabrication process to produce bismuth **nanowires** with ultrafine wire diameters and excellent materials properties, and studied the electronic transport properties of this new one-dimensional system. Because of the extremely small electron effective mass of Bi, these Bi **nanowires** provide an excellent system to study the unique properties of a quasi one-dimensional electron gas. First, Bi **nanowire** arrays with various wire diameters (13–110 <italic>nm</italic>) and high packing densities (as high as 7.1 × 10<super>10</super> <italic>wires</italic>/<italic> cm</italic><super>2</super>) were fabricated by pressure injection of liquid Bi into the evacuated channels of an **anodic alumina** template. Free-standing Bi **nanowires** with aspect ratios (length/diameter) as large as 1000 have been produced by dissolving the **anodic alumina** matrix without attacking the Bi **nanowires**. Various characterization techniques, such as transmission electron microscopy (TEM), scanning electron microscopy (SEM), selected-area electron diffraction (SAED), and X-ray diffraction (XRD), have been employed to investigate the physical structure and crystal structure of the Bi **nanowires**. Our Bi **nanowires** are shown to be dense and continuous, with a uniform wire diameter throughout the entire length of the wire. The individual **nanowires** are single crystals, and the **nanowires** have a similar crystal orientation along the wire axis in each array. The electrical transport properties of these Bi **nanowire** arrays were studied over a wide range of temperatures (2–300 <italic> K</italic>) and magnetic fields (0–5.4 <italic>T</italic>). At low temperatures, we observed clear classical size effects, whereby the scattering processes for electrons are dominated by the wire boundary scattering in the undoped single-crystal Bi **nanowires**. Strong evidence for a **quantum** confinement induced semimetal-to-semiconductor transition has been observed in the temperature dependence of the zero-field resistivity, and this transition is also suggested by optical transmission spectroscopy measurements. A theoretical model based on the electronic band structure of bulk Bi, suitably modified for the 1D case, has been constructed and is able to explain the many unusual phenomena observed in this new class of quasi-1D systems. (Copies available exclusively from MIT Libraries, Rm. 14-0551, Cambridge, MA 02139-4307. Ph. 617-253-5668; Fax 617-253-1690.)

20/9/6 (Item 6 from file: 94)
DIALOG(R)File 94:JICST-EPlus


02692583 JICST ACCESSION NUMBER: 96A0353868 FILE SEGMENT: JICST-E
Fabrication of Functional Thin Films with **Nanometer-Scale Textured** Surface Based on Supermolecular Structures.
MASUDA H (1)
(1) Tokyo Metropolitan University
Mem Fac Eng Tokyo Metrop Univ, **1995**, NO.45, PAGE.5055-5061, FIG.5, REF.15
JOURNAL NUMBER: F0357AAO ISSN NO: 0082-4747 CODEN: MTTMA
UNIVERSAL DECIMAL CLASSIFICATION: 539.23:669
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT**: Functional thin films with **nanometer**-scale textured geometrical surface were fabricated based on supermolecular structures of organic and inorganic materials. Processes and conditions for the fabrication of an ordered **nanohole** array of metals and semiconductors from a self-organized structure of **anodic** porous **alumina** or porous glass using a two-step replication technique were described. The two-step replication technique for the **nanohole** array, in which preparation of replicated negative structures and subsequent formation of positive structures resulted in a **nanohole** or **nanochannel** array with a geometrical structure identical to that of the mother template was applied. A fabricated semiconductor hole array composed of fine CdS particles showed a **quantum**-sized effect, which resulted in a change of optical properties due to the widening of the optical band gap. In addition to this, fabrication of a skeleton metal thin film from a monomolecular layer was shown. (author abst.) **DESCRIPTORS**: metallic thin film; **nanostructure**; platinum; nickel;
semiconductor thin film; texture processing; micro structure; **nanometer** process; surface structure; replica; **quantum** effect; Langmuir film; immobilized enzyme; biosensor; anodic oxidation(chemical reaction
BROADER **DESCRIPTORS**: metal; thin film; membrane and film; structure; platinum group metal; transition metal; metallic element; element; fourth row element; iron group element; semiconductor; treatment; fine patterning; working and processing; specimen for microscopy; sample; effect; monomolecular layer; monolayer; layer; enzyme; sensor; instrumentation element; oxidation; chemical reaction; electrochemical reaction
CLASSIFICATION CODE(S): BK14030T

20/9/7 (Item 7 from file: 94)
DIALOG(R)File 94:JICST-EPlus


02643523 JICST ACCESSION NUMBER: 96A0228148 FILE SEGMENT: JICST-E
Fabrication of Gold **Nanodot** Array Using **Anodic** Porous **Alumina** as an Evaporation Mask.
MASUDA H (1); SATOH M (1)
(1) Tokyo Metropolitan University, Tokyo, JPN
Jpn J Appl Phys Part 2, **1996**, VOL.35,NO.1B, PAGE.L126-L129, FIG.6, REF.29
JOURNAL NUMBER: F0599BAD ISSN NO: 0021-4922
UNIVERSAL DECIMAL CLASSIFICATION: 539.23:669 621.382.002.2
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication
**ABSTRACT**: A highly ordered gold **nanodot** array was fabricated by vacuum evaporation using an **anodic** porous **alumina** membrane with through-holes of **nanometer** scale as a mask. This technique resulted in an orderly arrangement of Au dots with a diameter of approximately 40 nm over a large area on a Si substrate. (author abst.) **DESCRIPTORS**: anodic oxidation(chemical reaction); porous medium; mask;
**nanostructure**; **nanometer** process; gold; vacuum deposition; silicon; alumina; **quantum** dot; electron microscopy
BROADER **DESCRIPTORS**: oxidation; chemical reaction; electrochemical reaction ; porous object; structure; fine patterning; working and processing; 1B group element; transition metal; metallic element; element; physical vapor deposition; vapor deposition; third row element; carbon group element; aluminum oxide; aluminum compound; 3B group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; microscopy; observation and view
CLASSIFICATION CODE(S): BK14030T; NC03030V

8/9/3 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


08996781 Genuine Article#: 354GF Number of References: 65
**Title: Fabrication of nanometer-scale patterns by ion-milling with porous anodic alumina masks**
Author(s): Almawlawi D (REPRINT) ; Bosnick KA; Osika A; Moskovits M
Corporate Source: UNIV TORONTO,DEPT CHEM, 80 ST GEORGE ST/TORONTO/ON M5S 3H6/CANADA/ (REPRINT); PHOTON RES ONTARIO,/TORONTO/ON M5S 3H6/CANADA/
**Journal**: ADVANCED MATERIALS, 2000, V12, N17 (SEP 1), P1252-&
ISSN: 0935-9648 **Publication Date**: 20000901
Publisher: WILEY-V C H VERLAG GMBH, MUHLENSTRASSE 33-34, D-13187 BERLIN, GERMANY
Language: English Document Type: ARTICLE
Geographic Location: CANADA
Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences; CC ENGI--Current Contents, Engineering, Computing & Technology
Journal Subject Category: MATERIALS SCIENCE
**Abstract**: The use of porous anodic alumina as a contact mask for ion-milling is demonstrated here to produce highly regular periodic arrays of nano-holes or bosses in an aluminum surface. The interaction of the molten aluminum with the alumina can be either wetting or non-wetting, according to the temperature of the melt, resulting in the formation of bosses (see Figure) or holes.
Identifiers--KeyWord Plus(R): SCANNING TUNNELING MICROSCOPE; MAGNETIC-PROPERTIES; OXIDIZED ALUMINUM; CARBON NANOTUBES; FORCE MICROSCOPE; NANOHOLE ARRAYS; PARTICLE-SIZE; QUANTUM DOTS; LITHOGRAPHY; OXIDE
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BRUNE H, 1998, V394, P451, NATURE
BRUS L, 1998, V59, P459, J PHYS CHEM SOLIDS
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CHE G, 1998, V10, P260, CHEM MATER
CHU W, 1992, V10, P2966, J VAC SCI TECHNOL B
CLARK TD, 1995, V117, P12364, J AM CHEM SOC
CROMMIE MF, 1993, V262, P218, SCIENCE
CROUSE D, 2000, V76, P49, APPL PHYS LETT
DATTA S, 1995, P246, ELECT TRANSPORT MESO
DAVYDOV DN, 1999, V86, P3983, J APPL PHYS
DEHEER WA, 1995, V270, P1179, SCIENCE
DIGGLE JW, 1969, V69, P365, CHEM REV
DIGGLE JW, 1969, V116, P737, J ELECTROCHEM SOC
LI AP, 1999, V11, P483, ADV MATER
**LI FY**, 1998, V10, P2470, CHEM MATER

20/9/2 (Item 2 from file: 94)
DIALOG(R)File 94:JICST-EPlus


04856794 JICST ACCESSION NUMBER: 98A0923900 FILE SEGMENT: JICST-E
**Fabrication of Ordered Nanostructures Based on Anodic Porous Alumina.**
MASUDA HIDEKI (1)
(1) Tokyo Metrop. University
Denshi Joho Tsushin Gakkai Taikai Koen Ronbunshu(Proceedings of the IEICE General Conference (Institute of Electronics, Information and Communication Engineers), **1998**, VOL.1998,sosaieti C1, PAGE.416-417, FIG.4, REF.6
JOURNAL NUMBER: G0508AEP
UNIVERSAL DECIMAL CLASSIFICATION: 681.7 621.382.002.2
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication
**DESCRIPTORS**: photonic band gap; crystal structure; periodic structure; alumina; anodic oxidation(chemical reaction); **nanostructure**; structure formation; self-organizing
BROADER **DESCRIPTORS**: **quantum** optics; optics; physics; natural science ; science; structure; aluminum oxide; aluminum compound; 3B group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; oxidation; chemical reaction; electrochemical reaction
CLASSIFICATION CODE(S): BD06010L; NC03030V

20/9/3 (Item 3 from file: 94)
DIALOG(R)File 94:JICST-EPlus


04794995 JICST ACCESSION NUMBER: 01A0237878 FILE SEGMENT: JICST-E
**Fabrication of Porous Alumina Templates for use in Two-Dimensional Magnetophotonic Crystals.**
KUMAGAI MASAAKI (1); INOUE MITSUTERU (1); FUJII TOSHITAKA (2)
Jst-presto
(1) Toyohashi Univ. of Technol.; (2) Aichikokadai
Denki Gakkai Magunetikkusu Kenkyukai Shiryo, **2000**, VOL.MAG-00,NO.316-325, PAGE.19-23, FIG.10, REF.6
JOURNAL NUMBER: Z0924AAQ
UNIVERSAL DECIMAL CLASSIFICATION: 535.374
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT:** **Anodic porous alumina with ordered nanochannel** -array is very attractive medium as a template of two-dimensional magnetophotonic crystals. The anodization of Al plates was achieved in oxalic acid solution. Ordering of the cell arrangement was found to be sensitive to the applied voltage, and a highly ordered structure was obtained under anodization at a constant voltage of 40V. Barrier layer was subsequently removed by ion-milling and wet-etching process. To obtain two-dimensional magnetophotonic crystals, embedding of magnetic fluid and gel precursor of dysprosium iron garnet into the porous alumina template was attempted. (author abst.)

**DESCRIPTORS:** alumina; sol-gel process; photonic band gap; YIG; anodic oxidation(chemical reaction); porous medium; magnetic fluid; rare earth additive alloy; periodic structure; through hole; microscopy
**IDENTIFIERS:** template
BROADER **DESCRIPTORS:** aluminum oxide; aluminum compound; 3B group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; **quantum** optics; optics; physics; natural science; science; garnet type crystal; crystal; solid(matter); ferrite; oxidation; chemical reaction; electrochemical reaction; porous object; suspension(disperse system); disperse system; fluid; rare earth containing alloy; containing alloy; structure; opening; hole; observation and view
CLASSIFICATION CODE(S): BD04010X

20/9/8 (Item 1 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online


01813483 ORDER NO: AADAA-I3001754
Fabrication of thermoelectric **wire-matrix composites** using electrodeposition
Author: Behnke, Joseph Frederick
Degree: Ph.D.
Year: 2000
Corporate Source/Institution: University of California, Berkeley (0028)
Chair: Timothy D. Sands
Source: VOLUME 62/01-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 468. 144 PAGES
**Descriptors:** ENGINEERING, MATERIALS SCIENCE
Descriptor Codes: 0794
ISBN: 0-493-10402-X

Thermoelectric materials have potential applications in a wide range of heating and cooling systems. Thermoelectric coolers, for example, are small, lightweight, and silent. They have no moving parts or fluids. What hinders a broader use of thermoelectric materials is their inefficiency when compared to compressor based systems. Theoretical studies have shown that there is a possible enhancement in thermoelectric properties through **quantum** confinement of the material. Recent studies have attempted to show this enhancement through the fabrication of multilayers, **quantum** wires and coupled **quantum** dots.

In this study, the fabrication of thermoelectric wire-matrix composites is attempted. Porous **anodic aluminum oxide** was chosen as the matrix material because of its high porosity, its uniform pore diameter, its low thermal conductivity, and its compatibility with current thermoelectric device structures. CoSb<sub> 3</sub> was chosen as the wire material because of its potential to show an enhancement in thermoelectric properties above bulk values at diameters greater than other commonly used thermoelectric materials. Electrodeposition was chosen as the method of fabrication, as it best allowed for infiltration of wire material into the matrix. It was found, however, that cobalt and antimony could not be electrodeposited into the porous matrix from the same bath. Therefore a two bath, multilayer approach was used to fabricate wires, using a post anneal to form the CoSb<sub>3</sub> phase. The formation of CoSb<sub>3</sub> was demonstrated by depositing alternating layers of cobalt from a CoS0<sub> 4</sub>7H<sub>2</sub>O bath and antimony from an Sb<sub>2</sub>0<sub>3</sub> bath. Both baths were aqueous and contained a supporting electrolyte of citric acid and potassium citrate. Depositing the antimony layer for 22 times the duration of the cobalt deposition gave the correct stoichiometry in the multilayers.

To form CoSb<sub>3</sub>, the multilayers were annealed in an antimony ambient at temperatures greater than 575°C. The post annealing was found to induce a shape change in the wires which appeared to have a sinusoidally varying radius with periodicity approximately equal to the multilayer period. This periodicity is not in a range where Rayleigh breakup would occur. Instead, there exists an 8.7% volume contraction on converting elemental cobalt and antimony to CoSb<sub>3</sub>. It is this contraction that is proposed as the cause of the observed wire breakup.

Since periodicity and void fraction are both at the control of the experimentalist, different structures could be generated—from uniformly sized **nanoparticles** to continuous bead arrays. These structures are likely to exhibit unusual thermal and electrical transport behavior, which will have to be measured in the future.

61/9/2 (Item 2 from file: 94)
DIALOG(R)File 94:JICST-EPlus


05125647 JICST ACCESSION NUMBER: 02A0213176 FILE SEGMENT: JICST-E
Fabrication of 2D **Superlattices** of Small Gold **Nanoparticles**.
HAYASHI TAKUHIRO (1); HAGA MASAAKI (1); TERANISHI TOSHIHARU (2); MIYAKE MIKIO (2); (2) Japan Advanced Inst. Sci. and Technol., Hokuriku
Nippon Kagakkai Koen Yokoshu, 2001, VOL.80th, PAGE.158
JOURNAL NUMBER: S0493AAY ISSN NO: 0285-7626
UNIVERSAL DECIMAL CLASSIFICATION: 548.736:546.3 546.72-386 621.3.049.77
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication
**ABSTRACT**: We investigated the formation of the 2D **superlattices** of monodispersed gold **nanoparticles** smaller than 2nm prepared by using the protective ligand having disulfide and 2,6-bis(benzimidazol-2-yl)pyridine groups, the former serving to produce small gold **nanoparticles** and the latter inducing the interaction between the ligands. The gold **nanoparticles** formed hexagonal network on the carbon substrate, and their interparticle spacing was controlled by the ligand length and/or interligand bridging with ferrous ions. (author abst.)
**DESCRIPTORS**: gold; two dimension; **superlattice**; microelectronics; protectant; gold complex; chloro complex; reduction(reaction); hydridoborate; iron complex; bridged complex; fluoroborate; complex formation; reaction rate; solvent effect; self-organizing; internuclear distance; ultrafine particle
**IDENTIFIERS**: **nanoparticle**
BROADER **DESCRIPTORS**: 1B group element; transition metal; metallic element; element; dimension; crystal lattice; lattice; electronics; technology; material; gold compound; 1B group element compound; transition metal compound; 1B group element complex; transition metal complex; metal complex; complex(compound); coordination compound; compound(chemical); chloride; chlorine compound; halogen compound; halide; halogeno complex ; chemical reaction; hydrido acid; hydride; hydrogen compound; boron oxyacid derivative; boron compound; **3B** group element compound; iron compound; iron group element compound; iron group element complex; polynuclear complex; fluoro acid; halogeno acid; fluoride; fluorine compound; velocity; effect; distance; length; geometric quantity; fine particle; particle
CLASSIFICATION CODE(S): BK06000V; CE01091H; NC03161C

52 ANSWER 7 OF 7 HCAPLUS **COPYRIGHT** ACS on STN
AN 2000:823090 HCAPLUS Full-text
DN 133:368551
ED Entered STN: 24 Nov 2000
TI Field-emitting electron source
IN Yamakishi, Toshio; Nanba, Masakazu; Okazaki, Saburo; Hirano, Yoshiyuki; Okamura, Noritomo; Katsuhara, Yukinori; Inoue, Shigeru
PA Japan Broadcasting Corp., Japan; Hitachi Electronics Co., Ltd.
SO Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01J001-304
CC 76-12 (Electric Phenomena)
Section cross-reference(s): 56
FAN.CNT 1

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| **PI JP 2000323011** | **A2** | **20001124** | **JP 1999-129122** | **19990510** |
| **PRAI JP 1999-129122** | | **19990510** | | |

AB The electron source, from which electrons are emitted by applying elec. voltage on a cathode and gate electrodes facing each other and the space sandwiched between the electrodes involves a porous elec. insulator. The elec. insulator has fine pores extended in the thickness direction as a result of anodization and pores involve emitters. Alternatively, the pores in the elec. insulator are formed by etching through a mask made of an **anodized porous film** having fine pores in the direction perpendicular to the thickness direction. The electron source with having submicron- to **nano-order emitters can be obtained without photolithog.**, i.e., at low cost.

IT Anodization
Electric insulators
Etching
Field emitters
(field-emitting electron source having elec. insulator involving emitter in micropores formed by anodization or etching)
IT Semiconductor device fabrication
(manufacture of field-emitting electron source having elec. insulator involving emitter in micropores formed by anodization or etching for)
IT Coating process
(plating; in manufacture of field-emitting electron source having elec. insulator involving emitter in micropores formed by anodization or etching)
IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-95-4, Magnesium, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-22-4, Silver, uses 7440-33-7, Tungsten, uses 7440-44-0, Carbon, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses
RL: DEV (Device component use); USES (Uses)
(emitter; field-emitting electron source having elec. insulator involving emitter in micropores formed by anodization or etching)
IT 1309-48-4, Magnesium oxide, uses 1313-96-8, Niobium oxide 1314-13-2, Zinc oxide, uses 1314-23-4, Zirconium oxide, uses 1314-61-0, Tantalum oxide **1344-28-1**, Alumina, uses 7631-86-9, Silica, uses 12055-23-1, Hafnium oxide 13463-67-7, Titania, uses
RL: DEV (Device component use); USES (Uses)
(insulator; field-emitting electron source having elec. insulator involving emitter in micropores formed by **anodization** or etching)
IT 409-21-2, Silicon carbide, processes 7782-40-3, Diamond, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(particles; in manufacture of field-emitting electron source having elec. insulator involving emitter in micropores formed by anodization or etching)

L118 ANSWER 18 OF 20 HCAPLUS **COPYRIGHT** ACS on STN
AN 1998:644513 HCAPLUS Full-text
DN 129:338270
ED Entered STN: 13 Oct 1998
TI GaAs and InP **nano**-hole **arrays** fabricated by reactive beam etching using highly ordered alumina membranes
AU Nakao, M.; Oku, S.; Tamamura, T.; Yasui, K.; Masuda, H.
CS NTT Opto-electronics Laboratories, Atsugi, 243-0198, Japan
SO International Conference on Indium Phosphide and Related Materials, 10th, Tsukuba, Japan, May 11-15, 1998 (1998), 781-784 Publisher: Institute of Electrical and Electronics Engineers, New York, N. Y.
CODEN: 66TCAF
DT Conference
LA English
CC 76-3 (Electric Phenomena)
AB Highly ordered **nano**-channel **arrays** consisting of an **anodic** porous **alumina** was used as a mask for a reactive beam etching (RBE) to transform the **nano**-channel pattern into **III-V** semiconductors. The alumina mask shows high tolerance to RBE using Br2/N2 mixed gas system. GaAs and InP **nano** -hole **arrays** with high aspect ratio were obtained.
ST gallium arsenide **nanohole array** fabrication; indium phosphide **nanohole array** fabrication; reactive beam etching ordered alumina membrane
IT Sputtering
(etching, reactive; fabrication of GaAs and InP **nano**-hole **arrays** by reactive beam etching using highly ordered alumina membranes)
IT Membranes, nonbiological
(fabrication of GaAs and InP **nano**-hole **arrays** by reactive beam etching using highly ordered alumina membranes)
IT Etching
(sputter, reactive; fabrication of GaAs and InP **nano**-hole **arrays** by reactive beam etching using highly ordered alumina membranes)
IT **1344-28-1**, Aluminum oxide (Al2O3), uses
RL: DEV (Device component use); USES (Uses)
(fabrication of GaAs and InP **nano**-hole **arrays** by reactive beam etching using highly ordered alumina membranes)
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Joannopoulos, J; Photonic crystals 1997
(2) Masuda, H; Appl Phys Lett 1997, V71, P2770 HCAPLUS
(3) Masuda, H; Jpn J Appl Phys 1996, V35, PL126 HCAPLUS
(4) Masuda, H; Science 1995, V268, P1466 HCAPLUS
(5) Oku, S; Conf Proc Indium Phosphide and Related Materials 1997, P574 HCAPLUS
(6) Wendt, J; J Vac Sci & Tech B 1993, V11, P2637 HCAPLUS
IT **1344-28-1**, Aluminum oxide (Al2O3), uses
RL: DEV (Device component use); USES (Uses)
(fabrication of GaAs and InP **nano**-hole **arrays** by reactive beam etching using highly ordered alumina membranes)
RN 1344-28-1 HCAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

no III-V top layer

L118 ANSWER 17 OF 20 HCAPLUS **COPYRIGHT** ACS on STN
AN 1999:216597 HCAPLUS Full-text
DN 130:304608
ED Entered STN: 07 Apr 1999
TI **GaAs and InP nanohole arrays fabricated by reactive beam etching using highly ordered alumina membranes**
AU Nakao, Masashi; Oku, Satoshi; Tamamura, Toshiaki; Yasui, Kenshi; Masuda, Hideki
CS NTT Opto-electronics Laboratories, Atsugi, 243-0198, Japan
SO Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes & **Review Papers (1999)**, 38(2B), 1052-1055
CODEN: JAPNDE; ISSN: 0021-4922
PB Japanese Journal of Applied Physics
DT Journal
LA English
CC 76-3 (Electric Phenomena)
AB Highly ordered **anodic** porous **alumina** was used as a mask for a reactive beam etching (RBE) to transform the **nanochannel** pattern into **III-V** semiconductors. The alumina mask showed high tolerance to RBE using a Br2/N2 mixed gas system. GaAs and InP **nanohole arrays** with a high aspect ratio and with a diameter uniformity of 2%, which was as good as that of the alumina mask, were obtained.
ST gallium arsenide **nanohole array** fabrication; indium phosphide **nanohole array** fabrication; reactive beam etching semiconductor **nanohole array**
IT Sputtering
(etching, reactive, reactive beam etching; GaAs and InP **nanohole arrays** fabricated by reactive beam etching using highly ordered alumina membranes)
IT Etching
(sputter, reactive, reactive beam etching; GaAs and InP **nanohole arrays** fabricated by reactive beam etching using highly ordered alumina membranes)
IT **1344-28-1**, Aluminum oxide (Al2O3), uses
RL: NUU (Other use, unclassified); USES (Uses)
(GaAs and InP **nanohole arrays** fabricated by reactive beam etching using highly ordered alumina membranes)
IT **1303-00-0**, Gallium arsenide, processes **22398-80-7**, Indium monophosphide, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(GaAs and InP **nanohole arrays** fabricated by reactive beam etching using highly ordered alumina membranes)
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Baba, T; Physica B 1996, V227, P415 HCAPLUS
(2) Cheng, C; J Vac Sci Technol B 1997, V15, P2764 HCAPLUS
(3) Fujisawa, Y; Jpn J Appl Phys 1997, V36, P7763
(4) Gruening, U; Appl Phys Lett 1995, V66, P3254 HCAPLUS
(5) Hamano, T; Jpn J Appl Phys 1997, V36, PL286 HCAPLUS
(6) Joannopoulos, J; Photonic Crystals and references therein 1995
(7) Krauss, T; Nature 1996, V383, P699 HCAPLUS
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(11) Masuda, H; Science 1995, V268, P1466 HCAPLUS
(12) Oku, S; Conf Proc Indium Phosphide and Related Materials 1997, P574 HCAPLUS
(13) Takizawa, T; Jpn J Appl Phys 1994, V33, PL643 HCAPLUS
(14) Wendt, J; J Vac Sci & Tech B 1993, V11, P2637 HCAPLUS
IT **1344-28-1**, Aluminum oxide (Al2O3), uses
RL: NUU (Other use, unclassified); USES (Uses)
(GaAs and InP **nanohole arrays** fabricated by reactive beam etching using highly ordered alumina membranes)
RN 1344-28-1 HCAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **1303-00-0**, Gallium arsenide, processes **22398-80-7**, Indium monophosphide, processes

L84 ANSWER 26 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:541207 HCAPLUS Full-text
DN 135:281495
ED Entered STN: 27 Jul 2001
TI Geometry and element composition of a nanoscale field emission array formed by self-organization in porous **anodic aluminum** oxide
AU Tatarenko, N. I.; Mozalev, A. M.
CS Russian Aerospace Agency, Federal State Unitarian Enterprise, "Scientific Research Institute of Precision Devices", Moscow, 127490, Russia
SO **Solid-State Electronics (2001)**, 45(6), 1009-1016
CODEN: SSELA5; ISSN: 0038-1101
PB Elsevier Science Ltd.
DT Journal
LA English
CC 76-12 (Electric Phenomena)
AB The paper reports the results of investigations by SEM technique and the Auger electron spectroscopy of geometrical parameters and element composition of a regular **nanoscale pillar** array (NPA) formed on the titanium layer as a result of electrochem. **anodizing** the double-layer thin film titanium-aluminum system due to the self-organization of the system at nanolevel. The gain packaging d. of pillars in such an array was 3.74+1010 pil/cm2 with the average diameter of a pillar of 37.5 nm. The height of a pillar in the array all over the surface of the tested samples was the same and its value is defined by the **anodizing** regimes of the double-layer thin film Ti-Al system. There is no need for this technique of field emission array fabrication to use submicron lithog. processes and practically there are no size limitations for the templates used that makes it very promising for fabricating cold-cathode flat panel displays.
ST nanoscale field emission array porous **anodic alumina**
IT Field emission
(nanoscale field emission array formed by self-organization in porous **anodic aluminum** oxide)
IT **1344-28-1, Alumina**, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**anodic** porous; nanoscale field emission array formed by self-organization in porous **anodic aluminum** oxide)
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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(2) Keller, F; J Electrochem Soc 1953, V100, P411 HCAPLUS
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(5) Surganov, V; J Appl Spectrosc [in Russian] 1998, V65(2), P200
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(9) Tatarenko, N; J Vac Sci Technol B 1999, V17(2), P647 HCAPLUS
(10) Tompson, G; Thin Solid Films 1997, V297, P192
IT **1344-28-1, Alumina**, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**anodic** porous; nanoscale field emission array formed by self-organization in porous **anodic aluminum** oxide)
RN 1344-28-1 HCAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L84 ANSWER 28 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2000:748421 HCAPLUS Full-text
DN 134:34321
ED Entered STN: 24 Oct 2000
TI IR spectroscopic investigation of **nanosize columnar** anodic tantalum oxides formed in a sulfuric-acid electrolyte
AU Surganov, V. F.; Mozalev, A. M.; Lastochkina, V. A.
CS Belarusian State University of Information Science and Radioelectronics, Minsk, Belarus
SO Journal of Applied Spectroscopy (Translation of Zhurnal Prikladnoi **Spektroskopii) (2000)**, 67(3), 412-417
CODEN: JASYAP; ISSN: 0021-9037
PB Consultants Bureau
DT Journal
LA English
CC 72-7 (Electrochemistry)
Section cross-reference(s): 56, 66
AB The element and phase composition of periodic **nanosize columnar** structures of anodic tantalum oxide was studied by the methods of electron microscopy and IR spectroscopy. The effect of voltage in forming a two-layer Ta-Al composite on the composition and structure of columnar anodic tantalum oxides is determined
ST IR spectra **nanosize columnar** anodic tantalum oxide
sulfuric acid; **nanosize columnar** anodic tantalum oxide; aluminum tantalum two layer anodization sulfuric acid
IT Electrodeposits
(anodic; IR spectroscopic study of **nanosize columnar** anodic tantalum oxides formed in sulfuric acid electrolyte)
IT IR spectra
Surface structure
(of anodic tantalum oxides)
IT Anodization
(of two-layer Ta-Al in sulfuric acid: IR spectroscopic study of **nanosize columnar** anodic tantalum oxides formed in a sulfuric acid electrolyte)
IT 7664-93-9, Sulfuric acid, uses
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(IR spectroscopic investigation of **nanosize columnar** anodic tantalum oxides formed in sulfuric acid electrolyte)
IT 1314-61-0, Tantalum oxide ta2o5 12035-90-4, Tantalum oxide tao 12036-14-5, Tantalum oxide tao2
RL: FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); FORM (Formation, nonpreparative); PROC (Process)
(IR spectroscopic study of **nanosize columnar** anodic tantalum oxides formed in sulfuric acid electrolyte)
IT 7429-90-5, **Aluminum**, properties 7440-25-7, Tantalum, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(**anodization** of two-layer Ta-Al in sulfuric acid: IR spectroscopic study of **nanosize columnar** anodic tantalum oxides formed in a sulfuric acid electrolyte)
RE.CNT 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

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(2) Bohr, J; Abstr 47th Annual Meeting of the International Society of Electrochemistry 1966, P25
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16/9/7 (Item 4 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online


01770875 ORDER NO: AADAA-IC801711
Magnetic nanostructures: An experimental study of structural, magnetic and transport properties
Author: Strijkers, Gustav Jacob
Degree: Dr.
**Year: 1999**
Corporate Source/Institution: Technische Universiteit Eindhoven (The Netherlands) (0426)
Source: VOLUME 61/02-C OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 553. 135 PAGES
**Descriptors:** PHYSICS, CONDENSED MATTER ; PHYSICS, ELECTRICITY AND MAGNETISM
Descriptor Codes: 0611; 0607
ISBN: 90-386-0897-7
Publisher: Eindhoven University of Technology, P.O. Box 513, 5600 MB Eindhoven, The Netherlands

The research of magnetic nanostructures is driven by exciting physical phenomena occuring in these systems with reduced dimensions, such as interlayer exchange coupling, Giant MagnetoResistance (GMR) and Tunneling MagnetoResistance (TMR). This thesis describes the research of these physical properties in a number of magnetic nanostructures. Much attention is paid to a thorough structural characterization of the materials, because this is essential in understanding the exchange coupling and magnetoresistance effects.

The most important results are listed below: (1) Chapter 3 deals with the interlayer exchange coupling in Fe/Si/Fe trilayers. With CEMS, AES and LEED it is proven that an <math> <f> <rm>Fe<inf>1-<it>x</it></inf>Si</rm></f> </math> interlayer with CsCl structure is formed, corroborating recent explanations for the interlayer coupling. (2) In chapter 5 the magnetization behavior of arrays of Co **nanowires**, grown by electrodeposition in the **pores of anodic alumina**, is discussed. These wires have a diameter of 20 and 100 nm and vary in length between 0.5 and 40 μm. The magnetization direction is determined by a competition of demagnetizing fields and dipole-dipole fields and can be tuned parallel or perpendicular to the wires by changing the length of the wires. (3) The GMR effect in Co/Cu/Co layers with very thin Co was studied in chapter 6. It is shown that spin-dependent scattering at the Co/Cu interfaces is the primary source of the GMR in Co/Cu. (4) In chapter 7, it is proven, by a direct comparison between FeMn and NiO exchange biased spin-valves, that partial specular reflection of electrons at the NiO interface leads to an increase of the GMR effect. (5) In chapter 8 TMR properties are studied of reactive sputtered FeHfO and FeHfSiO thin granular films, which are composed of Fe clusters surrounded by an insulating FeHf(Si)O matrix. The magnetoresistance shows a decrease with temperature, which cannot be explained by spin-dependent tunneling only. (6) In chapter 9 a structural study is presented of Co/oxidized-Al/Ni<sub>80</sub>Fe<sub>20</sub> thin films. <super> 59</super>Co nuclear magnetic resonance shows that the Co layers are not single crystalline but consist of a mixture of fcc and hcp Co. The oxidation of Al is the most crucial step in the fabrication of these layers, and our measurements of the spin-spin relaxation time show that Co becomes oxidized when the Al spacer layer is exposed to oxygen too long. (7) In chapter 10 we have investigated the magnetic behavior and structure of Fe<sub>3</sub>O<sub>4 </sub>/MgO multilayers. Magnetite (Fe<sub>3</sub>O<sub>4</sub>) is a half-metallic ferromagnet and therefore of technological importance for all-oxide tunnel junctions with possibly an infinite tunneling magnetoresistance. A detailed analysis of the direction of the magnetization as function of an externally applied magnetic field showed that these films have a high saturation field. (Abstract shortened by UMI.)

20/9/1 (Item 1 from file: 94)
DIALOG(R)File 94:JICST-EPlus


05067592 JICST ACCESSION NUMBER: 02A0098483 FILE SEGMENT: JICST-E
Magnetic Properties of **Pattern Nanowire Arrays** and Its Application In Perpendicular Recording.
QIN D-H (1); LU M (1); LI H-L (1)
(1) Lanzhou University, Gansu, Chn
Denshi Joho Tsushin Gakkai Gijutsu Kenkyu Hokoku(IEIC Technical Report (Institute of Electronics, Information and Communication Enginners), **2001**, VOL.101,NO.399(MR2001 38-53), PAGE.25-30, FIG.6, REF.7
JOURNAL NUMBER: S0532BBG
UNIVERSAL DECIMAL CLASSIFICATION: 621.315.5 621.382.002.2 621.3:681.327.1
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT:** Highly pattern **anodic aluminum oxide** (**AAO** ) was prepared by two steps anodic process. Uniform arrays of Co, Fe, Ni, CoNi and CoPt alloy **nanowires** were fabricated by electrochemical deposition. The micrographies and crystalloid structures of **nanowires** were studied by TEM, SEM, AFM and XRD. The magnetic properties were investigated by Moessbauer Spectrum (MS), Vibrating Sample Magnetometer and MFM. It was found that in the case of single metal **nanowire** arrays, the squareness (Mr/Ms) and coercivity of the hysteresis was very high when the external field was applied perpendicular the sample, which showed strong perpendicular anisotropy. XRD and Moessbauer show that preferred orientation existed in the case of Fe or Co **nanowires**. The magnetic properties were very complicate in alloy **nanowire** arrays. MFM results show that patterned single-domain structure existed in magnetic **nanowire** arrays with small diameter. The recording density could be as high as 100Gbit/cm2 if each single-domain element represents a bit of binary information, which was very attractive in highly density recording. (author abst.)
**DESCRIPTORS**: perpendicular magnetic recording; perpendicular magnetic anisotropy; **nanometer** process; **quantum** wire; anodic oxidation(chemical reaction); aluminum oxide; ferromagnet; magnetic domain structure; recording density; alpha iron(metal); Moessbauer spectrum; magnetic hysteresis; electrodeposition
BROADER **DESCRIPTORS**: magnetic recording; recording; magnetic anisotropy; anisotropy; property; magnetic property; fine patterning; working and processing; **nanostructure**; structure; oxidation; chemical reaction; electrochemical reaction; aluminum compound; 3B group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; magnetic substance; magnetic material; material; magnetic domain; density; pure iron; pure metal; metal; iron and steel; metallic material; gamma-ray spectrum; spectrum; magnetization characteristic; characteristic; hysteresis; irreversible process; process; precipitation(phase separation); phase separation; separation; adhesion(surface chemistry
CLASSIFICATION CODE(S): NC03020K; NC03030V; NC06020F

7/9/3 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


09823607 Genuine Article#: 454JN Number of References: 77
**Title**: Magnetism of Fe, Co and Ni nanowires in self-assembled arrays
Author(s): Sellmyer DJ (REPRINT) ; Zheng M; Skomski R
Corporate Source: Univ Nebraska,Dept Phys & Astron,Lincoln//NE/68588 (REPRINT); Univ Nebraska,Dept Phys & Astron,Lincoln//NE/68588; Univ Nebraska,Ctr Mat Res & Anal,Lincoln//NE/68588
**Journal**: JOURNAL OF PHYSICS-CONDENSED MATTER, **2001**, V13, N25 (JUN 25) , PR433-R460
ISSN: 0953-8984 **Publication Date**: 20010625
Publisher: IOP PUBLISHING LTD, DIRAC HOUSE, TEMPLE BACK, BRISTOL BS1 6BE, ENGLAND
Language: English Document Type: REVIEW
Geographic Location: USA
Journal Subject Category: PHYSICS, CONDENSED MATTER
**Abstract: Recent work on magnetic properties of transition-metal nanowire arrays produced by electro-deposition is reviewed.** The wires, which are electrodeposited into self-assembled porous anodic alumina, form nearly hexagonal arrays characterized by wire diameters down to less than 10 nm, wire lengths up to about 1 mum, and variable centre-to-centre spacings of the order of 50 nm. The fabrication and structural characterization of the arrays is summarized, magnetic data are presented and theoretical explanations of the behaviour of the wires are given. Emphasis is on extrinsic phenomena such as coercivity, magnetization reversal and interactions of the magnetic nanowires. In particular, we analyse how wire imperfections give rise to magnetic localization and dominate the hysteresis behaviour of the wires. Potential applications are outlined in the last section.
Identifiers--KeyWord Plus(R): ALUMINUM-OXIDE; ANODIC ALUMINA; RANDOM-ANISOTROPY; RECORDING CHARACTERISTICS; ACTIVATION-ENERGY; ORDERED PORES; FILMS; VISCOSITY; PARTICLE; MAGNETORESISTANCE
Cited References:
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LEDERMAN M, 1993, V73, P6961, J APPL PHYS
LI AP, 1998, V84, P6023, J APPL PHYS
LI AP, 1999, V11, P483, ADV MATER
**LI FY**, 1998, V10, P2470, CHEM MATER
LI F, 1995, THESIS U ALABAMA
LI FY, 1997, V81, P3806, J APPL PHYS 2A

20/9/4 (Item 4 from file: 94)
DIALOG(R)File 94:JICST-EPlus


04794994 JICST ACCESSION NUMBER: 01A0237877 FILE SEGMENT: JICST-E
Magnetoresistance in Magnetic **Nanowires**.
TSURUOKA MAKIKO (1); SAITO YUKI (1); YAMADA TSUTOMU (1); KAKUNO KEIICHI (1)
(1) Yokohama Natl. University
Denki Gakkai Magunetikkusu Kenkyukai Shiryo, **2000**, VOL.MAG-00,NO.316-325,
PAGE.15-18, FIG.5, REF.7
JOURNAL NUMBER: Z0924AAQ
UNIVERSAL DECIMAL CLASSIFICATION: 621.318.1 621.382.002.2
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT:** **Mesoscopic** magnetic metals are quite unique systems in which both magnetic and electric properties can show novel **quantum** behaviors. But there are many difficulties in preparing such small-sized material. **Nanometer-sized pores appear in aluminum samples, covered with oxide** layer by **anodization** in oxalic acid. Magnetoresistance(MR) with the current perpendicular to the layer is observed in magnetic **nanowaires** formed by electrodeposition into the pores. (author abst.)
**DESCRIPTORS**: pore(hole); magnetoresistance effect; **quantum** wire; ferromagnet; alumite; anodic oxidation(chemical reaction); nickel; cobalt; electrodeposition; magnetic hysteresis; **mesoscopic** system ; **nanometer** process
BROADER **DESCRIPTORS**: hole; galvanomagnetic effect; magnetic field effect; effect; **nanostructure**; structure; magnetic substance; magnetic material; material; oxide film; conversion coating film; film(cover); membrane and film; oxidation; chemical reaction; electrochemical reaction; fourth row element; element; iron group element; transition metal; metallic element; precipitation(phase separation); phase separation; separation; adhesion(surface chemistry); magnetization characteristic; magnetic property; characteristic; hysteresis; irreversible process; process; system; fine patterning; working and processing
CLASSIFICATION CODE(S): NA04040H; NC03030V

L84 ANSWER 35 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 1995:925268 HCAPLUS Full-text
ED Entered STN: 16 Nov 1995
TI Metallic and semiconductor **nano**-structure **arrays** fabricated in templates.
AU Moskovits, M.; Routkevitch, D.; Ryan, L.; AlMawlawi, D.
CS Department Chemistry, University Toronto, Toronto, ON, M5S 1A1, Can.
SO Book of Abstracts, 210th ACS National Meeting, Chicago, IL, August 20-24 **(1995), Issue Pt.** 2, PHYS-070 Publisher: American Chemical Society, Washington, D. C.
CODEN: 61XGAC
DT Conference; Meeting Abstract
LA English
AB **Anodic aluminum** oxide templates are used to produce **arrays** of parallel metal or semiconductor **nano**-wires with very narrow diameter distributions whose mean diams. can be varied continuously between 8 and 200 nm. Exptl. "devices" based on this technol. have been fabricated. Devices based on metal wires **capped** with thin oxide barriers, show distinct current-voltage steps reminiscent of coulomb blockade effects. The band-gaps of a series of CdS **nano**-wire **arrays** of varying mean wire diameter have been determined from the behavior of their resonance Raman spectra as a function of laser excitation wavelength. The band-gap energies display **quantum** size dependence not unlike what has been observed for CdS colloidal particles.

8/9/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


09227614 Genuine Article#: 381NF Number of References: 155
**Title: Metallorganic routes to nanoscale iron and titanium oxide particles encapsulated in mesoporous alumina: Formation, physical properties, and chemical reactivity**
Author(s): Schneider JJ (REPRINT) ; Czap N; Hagen J; Engstler J; Ensling J; Gutlich P; Reinoehl U; Bertagnolli H; Luis F; deJongh LJ; Wark M; Grubert G; Hornyak GL; Zanoni R
Corporate Source: GRAZ UNIV,INST CHEM, SCHUBERTSTR 1/A-8010 GRAZ//AUSTRIA/ (REPRINT); UNIV ESSEN GESAMTHSCH,INST ANORGAN CHEM/D-45117 ESSEN//GERMANY/; UNIV MAINZ,INST ANORGAN & ANALYT CHEM/D-55099 MAINZ//GERMANY/; UNIV STUTTGART,INST PHYS CHEM/D-70569 STUTTGART//GERMANY/; LEIDEN UNIV,KAMERLINGH ONNES LAB/NL-2300 RA LEIDEN//NETHERLANDS/; UNIV BREMEN,INST ANGEW & PHYS CHEM/D-28359 BREMEN//GERMANY/; NATL RENEWABLE ENERGY LAB,GOLDEN//CO/80401; UNIV ROMA LA SAPIENZA,DIPARTIMENTO CHIM/I-00185 ROME//ITALY/
**Journal**: CHEMISTRY-A EUROPEAN JOURNAL, **2000**, V6, N23 (DEC 1), P4305-4321
ISSN: 0947-6539 **Publication Date**: 20001201
Publisher: WILEY-V C H VERLAG GMBH, PO BOX 10 11 61, D-69451 BERLIN, GERMANY
Language: English Document Type: REVIEW
Geographic Location: AUSTRIA; GERMANY; NETHERLANDS; USA; ITALY
Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences
Journal Subject Category: CHEMISTRY
**Abstract**: Iron and titanium oxide nanoparticles have been synthesized in parallel mesopores of alumina by a novel organometallic ''chimie douce'' approach that uses bis(toluene)iron(0) (1) and bis(toluene)titanium(0) (2) as precursors. These complexes are molecular sources of iron and titanium in a zerovalent atomic state. In the case of 1, core shell iron/iron oxide particles with a strong magnetic coupling between both components, as revealed by magnetic measurements, are formed. Mossbauer data reveal superparamagnetic particle behavior with a distinct particle size distribution that confirms the magnetic measurements. The dependence of the Mossbauer spectra on temperature and particle size is explained by the influence of superparamagnetic relaxation effects. The coexistence of a paramagnetic doublet and a magnetically split component in the spectra is further explained by a distribution in particle size. From Mossbauer parameters the oxide phase can be identified as low-crystallinity ferrihydrite oxide. In agreement with quantum size effects observed in UV-visible studies, TEM measurements determine the size of the particles in the range 5-8 nm. The particles are mainly arranged alongside the pore walls of the alumina template. TiO2 nanoparticles are formed by depositing 2 in mesoporous alumina template. This produces metallic Ti, which is subsequently oxidized to TiO2 (anatase) within the alumina pores. UV-visible studies show a strong quantum confinement effect for these particles. From UV-visible investigations the particle size is determined to be around 2nm. XPS analysis of the iron- and titania- embedded nanoparticles reveal the presence of Fe2O3 and TiO2 according to experimental binding energies and the experimental line shapes. Ti4+ and Fe3+ are the only oxidation states of the particles which can be determined by this technique. Hydrogen reduction of the iron/iron-oxide nanoparticles at 500 degreesC under flowing H-2/N-2 produces a catalyst, which is active towards formation of carbon nanotubes by a CVD process. Depending on the reaction conditions, the formation of smaller carbon nanotubes inside the interior of larger carbon nanotubes within the alumina pores can be achieved. This behavior can be understood by means of selectively turning on and off the iron catalyst by adjusting the flow rate of the gaseous carbon precursor in the CVD process.
Descriptors--Author Keywords: aluminum ; iron ; nanostructures ; oxides ; titanium
Identifiers--KeyWord Plus(R): RAY PHOTOELECTRON-SPECTROSCOPY; POLARIZABLE WATER MODEL; ULTRAFINE CARBON TUBES; MAGNETIC-PROPERTIES;

L52 ANSWER 6 OF 7 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:688534 HCAPLUS Full-text
DN 136:13377
ED Entered STN: 20 Sep 2001
TI Micro-Raman investigation of GaN **nanowires** prepared by direct reaction Ga with NH3
AU Zhang, J.; Peng, X. S.; Wang, X. F.; Wang, Y. W.; Zhang, L. D.
CS Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, 230031, Peop. Rep. China
**SO Chemical Physics Letters (2001), 345(5,6), 372-376**
CODEN: CHPLBC; ISSN: 0009-2614
PB Elsevier Science B.V.
DT Journal
LA English
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 66, 78
AB Ordered crystalline GaN **nanowires** embedded in the **nanochannels of anodic alumina membrane** (AAM) were achieved by direct reaction Ga with NH3. The impact of reaction temps. on Raman spectroscopic properties of GaN **nanowires** was studied. X-ray diffraction and TEM observations demonstrate that the crystalline GaN **nanowires** have hexagonal wurtzite structure. The hexagonal wurtzite structure GaN **nanowires** prepared at 960° are .apprx.40 nm in diameter and up to several hundreds of micrometers in length.
ST gallium nitride; **nanowire** gallium nitride alumina membrane; Raman gallium nitride **nanowire**
IT Luminescence
Membranes, nonbiological
Quantum wire devices
Raman spectra
X-ray diffraction
(micro-Raman investigation of gallium nitride **nanowires** prepared by direct reaction gallium with ammonia in **anodized** alumina membranes)
IT **1344-28-1**, Alumina, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(micro-Raman investigation of gallium nitride **nanowires** prepared by direct reaction gallium with ammonia in **anodized** alumina membranes)
IT **25617-97-4P**, Gallium nitride (GaN)
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(micro-Raman investigation of gallium nitride **nanowires** prepared by direct reaction gallium with ammonia in **anodized** alumina membranes)
IT 7440-55-3, Gallium, reactions 7664-41-7, Ammonia, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(micro-Raman investigation of gallium nitride **nanowires** prepared by direct reaction gallium with ammonia in **anodized** alumina membranes)
RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
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28/9/2
DIALOG(R)File 2:INSPEC


5813590 INSPEC Abstract Number: A9805-8160-008
**Title: Microscopic patterning of orientated mesoscopic silica through guided growth**
Author(s): Trau, M.; Yao, N.; Kim, E.; Xia, Y.; Whitesides, G.M.; Aksay, I.A.
Author Affiliation: Dept. of Chem. Eng., Princeton Univ., NJ, USA
**Journal**: Nature vol.390, no.6661 p.674-6
Publisher: Macmillan Magazines,
**Publication Date**: 18-25 Dec. 1997 Country of Publication: UK
CODEN: NATUAS ISSN: 0028-0836
SICI: 0028-0836(19971218/25)390:6661L.674:MPOM;1-D
Material Identity Number: N003-97052
U.S. Copyright Clearance Center Code: 0028-0836/97/$12.00+2.00
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
**Abstract**: The supramolecular assembly of surfactant molecules at a solid-liquid interface can produce tubular structures with diameters of around 10 nm, which can be used for the templated polymerization of **mesoporous silica thin films**. The orientation of the tubules depends primarily on the nature of the substrate-surfactant interaction. These nanostructured films hold much promise for applications such as their use as orientated **nanowires**, sensor/actuator **arrays** and **optoelectronic** devices. But a method of patterning the tubules and orientating them into designed arrangements is required for many of these possibilities to be realized. Here we describe a method that allows the direction of growth of these tubules to be guided by infiltrating a reaction fluid into the microcapillaries of a mould in contact with a substrate. An electric field applied tangentially to the surface within the capillaries induces electro-osmotic flow, and also enhances the rates of silica polymerization around the tubules by localized Joule heating. After removal of the mould, patterned bundles of orientated **nanotubules** remain on the surface. This method permits the formation of orientated **mesoporous channels on a non-conducting substrate** with an arbitrary microscopic pattern. (26 Refs)
Subfile: A
**Descriptors**: lithography; mesoscopic systems; nanostructured materials; nanotechnology; polymerisation; silicon compounds
**Identifiers**: oriented mesoscopic silica; microscopic patterning; guided growth; supramolecular assembly; microcapillaries; electro-osmotic flow; polymerization; localized Joule heating; orientated **nanotubules**; nonconducting substrate; SiO/sub 2
**Class Codes**: A8160 (Corrosion, oxidation, etching, and other surface treatments); A7335 (Mesoscopic systems); A6820 (Solid surface structure); A8235 (Polymer reactions and polymerization); A6146 (Solid clusters (including fullerenes) and nanoparticles)
**Chemical Indexing**:
SiO2 sur - O2 sur - Si sur - O sur - SiO2 bin - O2 bin - Si bin - O bin (Elements - 2)

16/9/6 (Item 3 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online


01799011 ORDER NO: AADAA-IMQ40730
**NANO-WIRE FABRICATION USING ANODIC ALUMINUM OXIDE AS THE TEMPLATE**: EXPERIMENTAL STUDIES OF LOW-TEMPERATURE ANODIZATION, ELECTRODEPOSITION AND BAND GAP MEASUREMENT OF CADMIUM SULFIDE NANO-WIRES USING RESONANCE RAMAN SPECTROSCOPY

Author: CHAN, JIMMY
Degree: M.SC.
**Year: 1998**
Corporate Source/Institution: UNIVERSITY OF TORONTO (CANADA) (0779)
Adviser: MARTIN MOSKOVITS
Source: VOLUME 38/01 of MASTERS ABSTRACTS.
PAGE 212. 128 PAGES
**Descriptors**: CHEMISTRY, PHYSICAL ; ENGINEERING, ELECTRONICS AND ELECTRICAL
Descriptor Codes: 0494; 0544
ISBN: 0-612-40730-6

**Anodization** of **aluminum** in methanol solutions of $\rm H\sb2SO\sb4$ at sub-zero temperatures (0$\sp\circ$C to ${-}80\sp\circ$C) has been studied for the first time. The resulting **anodic aluminum oxide** (**AAO**) films have uniform and regular pores whose diameters are significantly smaller than those found in **AAO** films anodized at room-to-zero-temperature. The sub-zero temperature was successfully achieved using a novel electolytic apparatus that utilizes temperature-controlled nitrogen cooling and 1.2 M $\rm H\sb2SO\sb4$ in **3**:1 (by volume) mixture of methanol and water as the electrolyte. At a constant anodization temperature of ${-}40\sp\circ$C, for example, the pores of the resulting **AAO** template were as small as **3**.6 nm. Nonaqueous a.c. electrodeposition was then used to fabricate CdS **nano**-wires (of a mean diameter of **5** nm) by filling the pores of these **AAO nano-templates** with the semiconductor. Polarized Resonance Raman spectroscopy (RRS) was subsequently used to study these CdS **nano-wire arrays**.

38/9/3 (Item 3 from file: 94)
DIALOG(R)File 94:JICST-EPlus


01968447 JICST ACCESSION NUMBER: 94A0259999 FILE SEGMENT: JICST-E
Optical Properties of **Anodic Alumina** Films Containing **Nanoscale** Metal Particles.
SHIGA YASUNORI (1); SAITO MITSUNORI (1); MIYAGI MITSUNOBU (1)
(1) Tohoku University, Faculty of Engineering
Denshi Joho Tsushin Gakkai Gijutsu Kenkyu Hokoku(IEIC Technical Report (Institute of Electronics, Information and Communication Enginners), **1994**, VOL.93,NO.460(OQE93 165-173), PAGE.19-24, FIG.9, TBL.2, REF.10
JOURNAL NUMBER: S0532BBG
UNIVERSAL DECIMAL CLASSIFICATION: 535.3/.5.03
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT:** We **anodized aluminum** plates of 99.99% purity in a solution of sulfuric acid at a large current density. The formed **anodic alumina** films exhibited prominent polarization characteristics. To explain the origin of the polarization characteristics we assumed a model of an alumina film which contains unoxidized aluminum **columns**. The experimental results were explained successfully by the theoretical calculation based on the model. The amount of unoxidized aluminum atoms in the alumina films, which was measured by the ICP emission chemical analysis, was closely related to the polarization characteristics of the anodic films. The optical loss and the amount of unoxidized aluminum particles increased remarkably by using a Mg-doped aluminum plate as a starting material. (author abst.)
**DESCRIPTORS**: oxide film; anodic oxidation(chemical reaction); substrate(plate); polarized light; microcrystal; residue(object); ICP-ES(analysis); optical transmission; optical element; fine particle; current density; alumina; aluminum
BROADER **DESCRIPTORS**: conversion coating film; film(cover); membrane and film; oxidation; chemical reaction; electrochemical reaction; plate classified by application; plate(material); polarized wave; polarization; crystal; solid(matter); ICP(analysis); plasma spectrochemical analysis; instrumental analysis; analysis(separation); analysis; emission spectrometry; spectrochemical analysis; electromagnetic wave transmission; transmission(propagation); optical system; particle; density; aluminum oxide; aluminum compound; **3B** group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; metallic element; element; **3B** group element; third row element
CLASSIFICATION CODE(S): BM08010A

16/9/11
DIALOG(R)File 2:INSPEC


5647015 INSPEC Abstract Number: A9717-7865-060, B9709-2520D-031
**Title:** Optical properties of self-assembled **arrays** of InP **quantum wires confined in nanotubes of chrysotile asbestos**
Author(s): Romanov, S.G.; Sotomayor Torres, C.M.; Yates, H.M.; Pemble, M.E.; Butko, V.; Tretijakov, V.
Author Affiliation: Dept. of Electron. & Electr. Eng., Glasgow Univ., UK
**Journal:** Journal of Applied Physics vol.82, no.1 p.380-5
Publisher: AIP,
**Publication Date:** 1 July 1997 Country of Publication: USA
CODEN: JAPIAU ISSN: 0021-8979
SICI: 0021-8979(19970701)82:1L.380:OPSA;1-B
Material Identity Number: J004-97012
U.S. Copyright Clearance Center Code: 0021-8979/97/82(1)/380/6/$10.00
Document Number: S0021-8979(97)04711-7
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
**Abstract:** **Three-dimensional arrays of structurally confined InP wire-like nanostructures were grown in channels (nanotubes) of a chrysotile asbestos matrix** by metalorganic chemical vapor deposition. The formation of the InP compound was confirmed by absorption spectroscopy, X-ray diffraction and Raman scattering. It is shown that the density of states around the band edge increases with the InP loading of the matrix. Photoluminescence spectra of the asbestos filled in with InP consist mainly of two bands: a high energy band which is interpreted to be associated with charge transfer from InP to defect states of the asbestos and a low energy band which is associated with energy relaxation in the InP deposit itself. We show that the optical properties of this material are dominated by the size and dimensionality of the **pore** system of the matrix for heavy loading and by the semiconductor-to-matrix interface for light loading of the matrix with InP. (15 Refs)
Subfile: A B
**Descriptors:** CVD coatings; **III-V** semiconductors; indium compounds; nanostructured materials; photoluminescence; Raman spectra; semiconductor **quantum wires**; X-ray diffraction
**Identifiers:** self-assembled **arrays**; InP **quantum wires**; nanotubes; chrysotile asbestos; three-dimensional **arrays**; metalorganic chemical vapor deposition; absorption spectroscopy; X-ray diffraction; Raman scattering; photoluminescence spectra; charge transfer; defect states; size; dimensionality; semiconductor-to-matrix interface; InP
**Class Codes:** A7865J (Optical properties of nonmetallic thin films); A7830G (Infrared and Raman spectra in inorganic crystals); A7855D ( Photoluminescence in tetrahedrally bonded nonmetals); B2520D (II-VI and III-V semiconductors)
**Chemical Indexing:**
InP int - In int - P int - InP bin - In bin - P bin (Elements - 2)

L84 ANSWER 24 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:567876 HCAPLUS Full-text
DN 135:310196
ED Entered STN: 07 Aug 2001
TI Ordered indium-oxide nanowire **arrays** and their photoluminescence properties
AU Zheng, M. J.; Zhang, L. D.; Li, G. H.; Zhang, X. Y.; Wang, X. F.
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
SO **Applied Physics Letters (2001)**, 79(6), 839-841
CODEN: APPLAB; ISSN: 0003-6951
PB American Institute of Physics
DT Journal
LA English
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 72, 76, 77
AB Ordered semiconductor In2O3 nanowire **arrays** are uniformly assembled into hexagonally ordered nanochannels of **anodic alumina** membranes (**AAMs**) by electrodeposition and oxidizing methods. Their microstructures were characterized by x-ray diffraction, SEM, and transmission electron microscopy. A blue-green photoluminescence (PL) band in the wavelength range of 300-650 nm was observed in the In2O3/**AAM** assembly system. The PL intensity and peak position depend on the annealing temperature, which is mainly attributed to the singly ionized oxygen vacancy in the In2O3 nanowire **array** system.
ST ordered indium oxide nanowire **anodic alumina** membrane luminescence absorption
IT Microstructure
(SEM and TEM images of indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes prepared by electrodeposition of indium in nanoholes followed by annealing in air)
IT UV and visible spectra
(near-UV; of **anodic alumina** membranes and of indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes)
IT ESR (electron spin resonance)
(of **anodic alumina** membranes and of indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes)
IT Electrodeposition
(ordered indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes prepared by electrodeposition of indium in nanoholes followed by annealing in air)
IT Annealing
(oxidation during; ordered indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes prepared by electrodeposition of indium in nanoholes followed by annealing in air)
IT **Quantum** wire devices
(preparation and photoluminescence of ordered indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes)
IT .Defect level
(vacancy, oxygen; luminescence of ordered indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes in relation to)
IT Luminescence
(visible; of **anodic alumina** membranes and of indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes)
IT 1312-43-2P, Indium oxide (In2O3)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); PROC (Process); USES (Uses)
(nanowire; preparation and photoluminescence of ordered indium-oxide nanowire **arrays** embedded in **anodic alumina** membranes)
IT 7440-74-6, Indium, processes

L84 ANSWER 29 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2000:230783 HCAPLUS Full-text
DN 132:257551
ED Entered STN: 11 Apr 2000
TI Ordered semiconductor ZnO nanowire **arrays** and their photoluminescence properties
AU Li, Y.; Meng, G. W.; Zhang, L. D.; Phillipp, F.
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
SO Applied Physics Letters (2000), 76(15), 2011-2013
CODEN: APPLAB; ISSN: 0003-6951
PB American Institute of Physics
DT Journal
LA English
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
AB Ordered semiconductor ZnO nanowire **arrays** embedded in **anodic alumina** membranes (**AAM**) were fabricated by generating alumina templates with nanochannels, electrodepositing Zn in them, and then oxidizing the Zn nanowire **arrays**. The polycryst. ZnO nanowires with the diams. ranging from 15 to 90 nm were uniformly assembled into the hexagonally ordered nanochannels of the **AAM**. Photoluminescence (PL) measurements show a blue PL band in the wavelength range of 450-650 nm caused by the singly ionized O vacancy in ZnO nanowires.
ST semiconductor zinc oxide nanowire luminescence
IT Luminescence
Oxidation, electrochemical
**Quantum** wire devices
(ordered semiconductor ZnO nanowire **arrays** and photoluminescence properties)
IT 1314-13-2, Zinc oxide (ZnO), properties **1344-28-1**, Alumina, properties
RL: PRP (Properties)
(ordered semiconductor ZnO nanowire **arrays** and photoluminescence properties)
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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IT **1344-28-1**, Alumina, properties
RL: PRP (Properties)
(ordered semiconductor ZnO nanowire **arrays** and photoluminescence properties)
RN 1344-28-1 HCAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

16/9/2 (Item 2 from file: 94)
DIALOG(R)File 94:JICST-EPlus


03470597 JICST ACCESSION NUMBER: 98A0248000 FILE SEGMENT: JICST-E
Ordered Two-Dimensional **Nanowire** Array Formation Using Self-Organized **Nanoholes** of **Anodically** Oxidized **Aluminum**.
SHINGUBARA S (1); OKINO O (1); SAYAMA Y (1); SAKAUE H (1); TAKAHAGI T (1)
(1) Hiroshima University, Higashi-Hiroshima, JPN
Jpn J Appl Phys Part 1, **1997**, VOL.36,NO.12B, PAGE.7791-7795, FIG.9, REF.11
JOURNAL NUMBER: G0520BAE ISSN NO: 0021-4922
UNIVERSAL DECIMAL CLASSIFICATION: 621.382.002.2
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT:** Self-organization of a **two-dimensional array of nanoholes** which were formed by **anodic oxidation of aluminum** was investigated quantitatively using fast Fourier transformation (FFT) analysis of scanning electron microscopy (SEM) images. The **highly ordered array of nanoholes** with diameters of 26 nm was obtained by two-step anodization at anodic voltage around 40 **V**, and oxalic acid concentration of 0.5 M. **A two-dimensional ordered array of Au free standing nanowires** was successfully fabricated by the deposition of Au using DC electroplating in **nanoholes** of aluminum oxide, by removal of the aluminum oxide barrier layer using wet chemical etching. The present method has a high efficiency to fabricate ordered **nanowire** array of a variety of conductive materials in a large area, and wide applications for fabricating **quantum** effect devices and materials would be expected. (author abst.)

**DESCRIPTORS**: anodic oxidation(chemical reaction); porous medium; aluminum oxide; self organization system; **nanostructure**; electroplating; gold; etching
BROADER **DESCRIPTORS**: oxidation; chemical reaction; electrochemical reaction ; porous object; aluminum compound; **3B** group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; system; structure; plating; surface treatment; treatment; 1B group element; transition metal; metallic element; element
CLASSIFICATION CODE(S): NC03030V

20/9/5 (Item 5 from file: 94)
DIALOG(R)File 94:JICST-EPlus


04783703 JICST ACCESSION NUMBER: 01A0197262 FILE SEGMENT: JICST-E
Patterned Ultra-High-Density Magnetic Storage Medium.
SHAOGUANG Y (1); HAO Z (1); YOUWEI D (1)
(1) Physics Dep. Nanjing University, Nanjing, Chn
Denshi Joho Tsushin Gakkai Gijutsu Kenkyu Hokoku(IEIC Technical Report (Institute of Electronics, Information and Communication Enginners), 2000, VOL.100,NO.422(MR2000 35-48), PAGE.75-81, FIG.8, REF.8
JOURNAL NUMBER: S0532BBG
UNIVERSAL DECIMAL CLASSIFICATION: 621.318.1 621.382.002.2
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT:** **Anodic aluminum oxide**(**AAO**) membranes with ordered **nanochannel** have been prepared as the disk for fabrication of patterned magnetic storage media. **Metallic nanowire arrays** have been prepared by **electrodepositing the corresponding materials into pores of the AAO membranes**. Magnetic property of the **nanowire** array reveals that this kind of array can be used as vertical recording media. The storage density of this media would reach 170Gbit per square inch. (author abst.)
**DESCRIPTORS**: information medium; perpendicular magnetic recording; recording density; anodic oxidation(chemical reaction); aluminum oxide; electrodeposition; **quantum wire**; micro structure; magnetic anisotropy; magnetic recording material; coercive force; magnetic hysteresis; **nanometer** process; thin film
BROADER **DESCRIPTORS**: magnetic recording; recording; density; oxidation; chemical reaction; electrochemical reaction; aluminum compound; 3B group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; precipitation(phase separation); phase separation; separation; adhesion(surface chemistry); **nanostructure**; structure; anisotropy; property; magnetic property ; recording material; material; magnetic material; magnetization characteristic; characteristic; hysteresis; irreversible process; process; fine patterning; working and processing; membrane and film
CLASSIFICATION CODE(S): NA04040H; NC03030V

57/9/14
DIALOG(R)File 2:INSPEC


5382083 INSPEC Abstract Number: B9611-4360-023
**Title:** **Photoresist-free** microstructuring of **III-V** semiconductors with laser-assisted dry etching ablation
Author(s): Dubowski, J.J.; Bielawski, M.; Mason, B.
Author Affiliation: Inst. for Microstructural Sci., Nat. Res. Council of Canada, Ottawa, Ont., Canada
**Journal:** Proceedings of the SPIE - The International Society for Optical Engineering **Conference Title:** Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.2703 p.405-10
Publisher: SPIE-Int. Soc. Opt. Eng,
**Publication Date:** 1996 Country of Publication: USA
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(1996)2703L.405:PFMS;1-Y
Material Identity Number: C574-96155
U.S. Copyright Clearance Center Code: 0 8194 2077 8/96/$6.00
**Conference Title:** Lasers as Tools for Manufacturing of Durable Goods and Microelectronics
Conference Sponsor: SPIE
Conference Date: 29 Jan.-2 Feb. 1996 Conference Location: San Jose, CA, USA
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Applications (A); Practical (P); Experimental (X)
**Abstract:** The progress in manufacturing of integrated microelectronic and **optoelectronic devices** requires new technologies which would make possible printing of **nanometer-size features** and/or which would offer cost effective solutions in the fabrication of micrometer-size devices. Laser-induced direct (photoresist-free) patterning of materials has been recently investigated as a method that has some potential in that area. We have applied laser-assisted dry etching ablation for contact, proximity and projection mask lithography of **III-V** semiconductor films, quantum wells and **superlattices**. It has been shown that micrometer-size structures of those materials can be directly fabricated following exposure to excimer laser radiation in an atmosphere of chlorine diluted in helium. The results indicate that the process has the potential for fabrication of high quality **quantum wire** and **quantum dot structures**. (15 Refs)
Subfile: B
**Descriptors:** **III-V** semiconductors; integrated circuit manufacture; **integrated optoelectronics**; **laser ablation**; laser beam etching; masks; photolithography; proximity effect (lithography); **semiconductor quantum dots**; **semiconductor quantum wells**; **semi**conductor **quantum wires**; semiconductor superlattices; semiconductor thin films
**Chemical Indexing:**
**InP** int - In int - P int - **InP** bin - In bin - P bin (Elements - 2)
**InP** sur - In sur - P sur - **InP** bin - In bin - P bin (Elements - 2)

L84 ANSWER 23 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:583283 HCAPLUS Full-text
DN 135:230067
ED Entered STN: 13 Aug 2001
TI Preparation of highly ordered **nanoporous** Co membranes assembled by small **quantum**-sized Co particles
AU Lei, Y.; Liang, C. H.; Wu, Y. C.; Zhang, L. D.; Mao, Y. Q.
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
SO Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer **Structures (2001)**, 19(4), 1109-1114
CODEN: JVTBD9; ISSN: 0734-211X
PB American Institute of Physics
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
Section cross-reference(s): 77
AB Highly ordered **nanoporous** Co membranes were fabricated by a **two**-step replication from the honeycomb structure of porous **anodic alumina**. These metal membranes are confirmed to have **two** substructures: first, the Co membrane consists of fine **quantum**-sized particles with diams. of ≈2-5 nm; **second**, the fine Co particles are assembled in a superstructure, i.e., fine and uniform channels 50 nm in diameter, ≥16 μm in thickness, having a pore d. of ≈1010 cm-2. New techniques were introduced into the **two**-step replication process, resulting in new features of the replicated metal membrane: high aspect ratio (≥320:1), highly ordered pore **arrays**, and narrow size distributions of the pore diams. These new techniques also lead to simplification of the fabrication process of metal membranes. Double-sided and single-sided Co membranes can be achieved simply by adjusting the electroless deposition time.
ST cobalt **nanomembrane** electroless deposition
IT Honeycomb structures
Membranes, nonbiological
Porosity
(electroless deposition of highly ordered **nanoporous** Co membranes)
IT Coating process
(electroless; electroless deposition of highly ordered **nanoporous** Co membranes)
IT 7440-48-4, Cobalt, processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(films, membranes; electroless deposition of highly ordered **nanoporous** Co membranes)
IT **1344-28-1**, Alumina, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(porous, substrate; electroless deposition of highly ordered **nanoporous** Co membranes on)
RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L84 ANSWER 30 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2000:105495 HCAPLUS Full-text
DN 132:230197
ED Entered STN: 15 Feb 2000
TI Preparation of macroscopic **two-dimensional ordered array of indium nanodots**
AU Chen, S. H.; Fei, G. T.; Cui, P.; Cheng, G. S.; Zhu, Y.; Zhu, X. G.; Zeng, Z. Y.; Zhang, L. D.
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
SO Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer **Structures (2000)**, 18(1), 10-12
CODEN: JVTBD9; ISSN: 0734-211X
PB American Institute of Physics
DT Journal
LA English
CC 76-3 (Electric Phenomena)
AB A macroscopic **two**-dimensional highly ordered **array** of indium **nanodots** was achieved using a very simple method of vacuum evaporation on **anodic aluminum**. The ordered indium **nanodots**, seated on small, shallow holes of an Al template, are arranged in a rhombic pattern with a typical period of about 100 nm. The formation mechanism of the indium **nanodots** is discussed.
ST indium **nanodot** prepn
IT **Quantum** dot devices
(preparation of macroscopic **two**-dimensional ordered **array** of indium **nanodots**)
IT 7440-74-6, Indium, uses
RL: DEV (Device component use); USES (Uses)
(preparation of macroscopic **two**-dimensional ordered **array** of indium **nanodots**)
IT 7429-90-5, Aluminum, uses
RL: DEV (Device component use); USES (Uses)
(substrate; preparation of macroscopic **two**-dimensional ordered **array** of indium **nanodots**)
RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
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16/9/10
DIALOG(R)File 2:INSPEC


6526270 INSPEC Abstract Number: A2000-08-6865-011, B2000-04-2530C-039
**Title**: Quantum-confined gallium nitride in MCM-41
Author(s): Winkler, H.; Birkner, A.; Hagen, V.; Wolf, I.; Schmechel, R.; von Seggern, H.; Fischer, R.A.
Author Affiliation: Lehrstuhl fuer Anorg. Chem. II, Ruhr-Univ. Bochum, Germany
**Journal**: Advanced Materials vol.11, no.17 p.1444-8
Publisher: VCH Verlagsgesellschaft,
**Publication Date**: 1 Dec. 1999 Country of Publication: Germany
CODEN: ADVMEW ISSN: 0935-9648
SICI: 0935-9648(19991201)11:17L.1444:QCGN;1-F
Material Identity Number: M606-2000-001
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
**Abstract**: **Filling the pores of molecular sieves** is a way to achieve **regular nanoscale arrays** of materials at drastically reduced production costs. **The loading of zeolite MCM-41 with semiconductor GaN** is reported here for the first time using the triazidogallium precursor. The loading process and the subsequent conversion into GaN are thus possible in a non-aqueous medium and can be conveniently followed by IR. (27 Refs)
Subfile: A B
**Descriptors**: gallium compounds; **III-V** semiconductors; infrared spectra; light absorption; mesoscopic systems; nanostructured materials; nanotechnology; nuclear magnetic resonance; photoluminescence; **porous** materials; quantum interference phenomena; **semiconductor quantum dots**; **size effect**; **trans**mission electron microscopy; zeolites
**Identifiers**: gallium nitride nanocrystals; MCM-41 zeolite; quantum confinement; molecular sieves; nanoscale **arrays** fabrication; zeolite loading; triazidogallium precursor; **pore** loading process; GaN production mechanism; nonaqueous medium synthesis; infrared spectroscopy; X-ray diffraction; TEM; transmission electron microscopy; photoluminescence ; NMR; nuclear magnetic resonance; PL excitation spectra; mesoscopic systems; quantum size effects; GaN
**Class Codes**: **A6865** (Low-dimensional structures: growth, structure and nonelectronic properties); A6146 (Structure of solid clusters, nanoparticles, and nanostructured materials); A7335 (Mesoscopic systems and quantum interference); A7830G (Infrared and Raman spectra in inorganic crystals); A7855E (Photoluminescence in II-VI and III-V semiconductors); A7865K (Optical properties of III-V and II-VI semiconductors (thin films/low-dimensional structures)); B2530C (Semiconductor superlattices, quantum wells and related structures); B2550N (Nanometre-scale semiconductor fabrication technology
**Chemical Indexing**:
GaN bin - Ga bin - N bin (Elements - 2)

7/9/8 (Item 8 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


09330282 Genuine Article#: BR42Q Number of References: 177
**Title: Quantum wells and quantum wires for potential thermoelectric applications**
Author(s): Dresselhaus MS (REPRINT) ; Lin YM; Cronin SB; Rabin O; Black MR; Dresselhaus G; Koga T
Corporate Source: MIT,Francis Bitter Natl Magnet Lab,77 Massachusetts Ave/Cambridge//MA/02139 (REPRINT); MIT,Francis Bitter Natl Magnet Lab,Cambridge//MA/02139; Harvard Univ,Dept Appl Phys,Cambridge//MA/02138
, **2001**, V71, P1-121
ISSN: 0080-8784 **Publication Date**: 20010000
Publisher: ACADEMIC PRESS INC, 525 B STREET, SUITE 1900, SAN DIEGO, CA 92101-4495 USARECENT TRENDS IN THERMOELECTRIC MATERIALS RESEARCH III
Series: SEMICONDUCTORS AND SEMIMETALS
Language: English Document Type: ARTICLE
Geographic Location: USA
Journal Subject Category: ENGINEERING, ELECTRICAL & ELECTRONIC; PHYSICS, CONDENSED MATTER
Identifiers--KeyWord Plus(R): THIN BI WIRES; BISMUTH NANOWIRE ARRAYS; MOLECULAR-BEAM EPITAXY; THERMAL-CONDUCTIVITY; TRANSPORT-PROPERTIES; LEAD CHALCOGENIDES; CURRENT CARRIERS; HIGH FIGURE; PBTE-BI; SUPERLATTICES
Cited References:
**LI FY**, 1998, V10, P2470, CHEM MATER
ZHANG ZB, 1999, V11, P1659, CHEM MATER
ZHANG ZB, 1999, V545, P351, MATER RES SOC SYMP P
ZHANG ZB, 1999, THESIS MIT
ZHANG ZB, 1998, V73, P1589, APPL PHYS LETT
ZHANG ZB, 2000, V61, P4850, PHYS REV B
ZHANG ZB, 1998, V13, P1745, J MATER RES

61/9/4 (Item 4 from file: 94)
DIALOG(R)File 94:JICST-EPlus


04543461 JICST ACCESSION NUMBER: 00A0234074 FILE SEGMENT: JICST-E
Structures and magnetic properties of oriented Fe/Au and Fe/Pt **nanoparticles** on a-Al2O3.
BIAN B (1); HIROTSU Y (1); SATO K (1); OHKUBO T (1); MAKINO A (2)
(1) Osaka University, Osaka, Jpn; (2) Alps Electric Co. Ltd, Nagaoka, Jpn
J Electron Microsc, **1999**, VOL.48,NO.6, PAGE.753-759, FIG.10, REF.16
JOURNAL NUMBER: G0104AAV ISSN NO: 0022-0744
UNIVERSAL DECIMAL CLASSIFICATION: 669.017:537.6.03 539.23:669
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
**ABSTRACT**: Granular thin films of oriented A-Fe **nanoparticles** on **a-Al2O3** were fabricated by electron beam evaporation technique. The process took advantage of the overgrowth of A-Fe on Au or Pt 'seed' particles epitaxially grown on (100) NaCl substrates, which were later removed in distilled water. The crystallographic orientation between A-Fe and Au(Pt) nanocrystals was (100)Au(Pt)//(100)Fe with {010}Au(Pt)//{011}Fe. The magnetic coercivity of the oriented A-Fe particles was controllable by particle size and inter-particle distance. Annealing of the a-Al2O3/Fe/Pt films at temperatures higher than 500.DEG.C. led to a formation of the ordered L10-FePt phase. Any one of the three (100) axes of the fcc parent phase acted as the tetragonal c-axis of the L10 superstructure. Magnetic coercivities of a-Al2O3/Fe/Pt films were found to be largely increased by heat treatment. The coercivity of the annealed a-Al2O3/Fe/Pt films reached as high as 3.5kOe with a squareness of 0.74. It has been shown that magnetic property can be improved by controlling orientation and structure of the magnetic particles. (author abst.)

**DESCRIPTORS**: evaporated film; fine particle; gold; platinum; alpha iron(metal); alumina; coercive force; particle size(ratio); spacing; annealing; **superlattice**; ordering; crystal orientation; electron beam deposition; crystal structure; amorphous state; crystallization
**IDENTIFIERS**: alpha-alumina
BROADER **DESCRIPTORS**: thin film; membrane and film; particle; 1B group element; transition metal; metallic element; element; platinum group metal; pure iron; pure metal; metal; iron and steel; metallic material; aluminum oxide; aluminum compound; **3B** group element compound; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; magnetization characteristic; magnetic property; characteristic; degree; heat treatment; treatment; crystal lattice; lattice; modification; orientation(direction); vacuum deposition; physical vapor deposition; vapor deposition; structure; glassy state; solid(matter
CLASSIFICATION CODE(S): WB02020J; BK14030T

3/9/3 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


07097062 Genuine Article#: 123XH Number of References: 60
**Title**: On the growth of **highly ordered pores** in anodized aluminum oxide
Author(s): Li FY; Zhang L; Metzger RM (REPRINT)
Corporate Source: UNIV ALABAMA,CTR MAT INFORMAT TECHNOL, BOX 870336/TUSCALOOSA//AL/35487 (REPRINT); UNIV ALABAMA,CTR MAT INFORMAT TECHNOL/TUSCALOOSA//AL/35487; UNIV ALABAMA,DEPT CHEM/TUSCALOOSA//AL/35487
**Journal**: CHEMISTRY OF MATERIALS, **1998**, V10, N9 (SEP), P2470-2480
ISSN: 0897-4756 **Publication Date**: 19980900
Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036
Language: English Document Type: ARTICLE
Geographic Location: USA
Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences; CC ENGI--Current Contents, Engineering, Computing & Technology
Journal Subject Category: CHEMISTRY, PHYSICAL; MATERIALS SCIENCE
**Abstract**: It is now established that hexagonally ordered domain structures can be formed in anodic alumina films by repeated anodization and stripping of the porous oxide. We find that the domain size is a linear function of time and increases with temperature. The pore density is initially high but decreases with anodizing time, as dominant pores deepen. Very small pores exist in native oxide in air or nucleate after electropolishing. Pore growth may start when the electric field increases at the pore bottoms, and acid dissolves the oxide locally.
Identifiers--KeyWord Plus(R): POROUS SILICON; MAGNETIC VISCOSITY; ACTIVATION VOLUME; PARTICLE-SIZE; FILMS; MORPHOLOGY; OXIDATION; MECHANISM; ARRAYS; MEDIA
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8/9/5 (Item 5 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


07889664 Genuine Article#: 219VA Number of References: 32
**Title: Processing and characterization of single-crystalline ultrafine bismuth nanowires**
Author(s): Zhang ZB; Gekhtman D; Dresselhaus MS; Ying JY (REPRINT)
Corporate Source: MIT,DEPT CHEM ENGN/CAMBRIDGE//MA/02139 (REPRINT); MIT,DEPT CHEM ENGN/CAMBRIDGE//MA/02139; MIT,DEPT PHYS/CAMBRIDGE//MA/02139; MIT,DEPT ELECT ENGN & COMP SCI/CAMBRIDGE//MA/02139
**Journal**: CHEMISTRY OF MATERIALS, 1999, V11, N7 (JUL), P1659-1665
ISSN: 0897-4756 **Publication Date**: 19990700
Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036
Language: English Document Type: ARTICLE
Geographic Location: USA
Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences; CC ENGI--Current Contents, Engineering, Computing & Technology
Journal Subject Category: CHEMISTRY, PHYSICAL; MATERIALS SCIENCE
**Abstract: By pressure injecting Bi liquid melt into the nanochannels of an anodic alumina template**, we have successfully fabricated Bi nanowire arrays with ultrafine wire diameters and extremely high wire packing densities. Free-standing Bi nanowires with controlled wire diameters and large aspect ratios (length/diameter) were also obtained by subsequent etching of the alumina template. Various techniques such as SEM, TEM, AFM, EFM,HREM, and XRD have been used to investigate the physical characteristics of these nanowires. The Bi nanowires were found to be dense and continuous and had a uniform diameter throughout the length of the wires. Individual Bi nanowires were shown to be single crystals, and all the wires in an array were highly oriented. An interesting metastable phase of Bi was also observed, which can be attributed to a lattice stress-induced high-pressure phase of Bi formed inside the porous anodic alumina template.
Identifiers--KeyWord Plus(R): TEMPLATE SYNTHESIS; CARBON NANOTUBES; ALUMINUM-OXIDE; ANODIC ALUMINA; WIRE ARRAYS; QUANTUM; FABRICATION; GROWTH; FILMS
Cited References:
*DIG INSTR, DIM 3000 OP MAN
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7/9/7 (Item 7 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


09430129 Genuine Article#: 404VM Number of References: 23
**Title**: Square and triangular nanohole array architectures in anodic alumina
Author(s): Masuda H (REPRINT) ; Asoh H; Watanabe M; Nishio K; Nakao M; Tamamura T
Corporate Source: Tokyo Metropolitan Univ,Sch Engn, Dept Appl Chem,1-1 Minamiosawa/Tokyo 19203//Japan/ (REPRINT); Tokyo Metropolitan Univ,Sch Engn, Dept Appl Chem,Tokyo 19203//Japan/; NTT,Photon Lab,Atsugi/Kanagawa 24301/Japan/; NTT,Basic Res Lab,Atsugi/Kanagawa 24301/Japan/
**Journal**: ADVANCED MATERIALS, **2001**, V13, N3 (FEB 5), P189-192
ISSN: 0935-9648 **Publication Date**: 20010205
Publisher: WILEY-V C H VERLAG GMBH, PO BOX 10 11 61, D-69451 BERLIN, GERMANY
Language: English Document Type: ARTICLE
Geographic Location: Japan
Journal Subject Category: MATERIALS SCIENCE, MULTIDISCIPLINARY
Identifiers--KeyWord Plus(R): POROUS ALUMINA; ACID-SOLUTION; OXIDE; FILMS; MEMBRANES; PORES
Cited References:
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MASUDA H, 1995, V268, P1466, SCIENCE
MASUDA H, 1998, V37, PL1340, JPN J APPL PHYS 2
OSULLIVAN JP, 1970, V317, P511, P ROY SOC LOND A MAT
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THOMPSON GE, 1978, V18, P481, CORROS SCI
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VORONOI G, 1908, V134, P198, J REINE ANGEW MATH
WHITNEY TM, 1993, V261, P1316, SCIENCE

L84 ANSWER 25 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:559210 HCAPLUS Full-text
DN 135:309865
ED Entered STN: 03 Aug 2001
TI Synthesis of highly ordered CdSe nanowire **arrays** embedded in **anodic alumina** membrane by electrodeposition in ammonia alkaline solution
AU Peng, X. S.; Zhang, J.; Wang, X. F.; Wang, Y. W.; Zhao, L. X.; Meng, G. W.; Zhang, L. D.
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
**SO** **Chemical Physics Letters (2001)**, 343(5,6), 470-474
CODEN: CHPLBC; ISSN: 0009-2614
PB Elsevier Science B.V.
DT Journal
LA English
CC 72-2 (Electrochemistry)
Section cross-reference(s): 76
AB Highly ordered polycryst. CdSe nanowire **arrays** were synthesized by d.c. electrodeposition in **anodic alumina** membrane ( **AAM**) from ammonia alkaline solution containing CdCl2 and SeO2. These nanowires have uniform diams. of .apprx.60 nm, which correspond to the pore sizes of the membranes used. The XRD patterns indicate that the CdSe nanowires crystallize in a wurtzite structure. The x-ray photoelectron energy spectroscopy and the energy dispersing anal. spectroscopy studies demonstrate that stoichiometric CdSe is formed, and the ratio of selenium to cadmium depends on the pH of the deposition bath. A mechanism for the nanowires growth is suggested.
ST cadmium selenide nanowire **array** electrodeposition **anodic alumina** membrane
IT Electrodeposits
(**anodic**; synthesis of highly ordered CdSe nanowire **arrays** embedded in **anodic alumina** membrane by electrodeposition in ammonia alkaline solution containing CdCl2 and SeO2)
IT Crystallization
(electrocrystallization; of CdSe nanowire **arrays** in ammonia alkaline solution containing CdCl2 and SeO2)
IT Order
pH
(in synthesis of highly ordered CdSe nanowire **arrays** embedded in **anodic alumina** membrane by electrodeposition in ammonia alkaline solution containing CdCl2 and SeO2)
IT X-ray photoelectron spectra
(of CdSe nanowire **arrays**)
IT Electrodeposition
**Quantum** wire devices
(synthesis of highly ordered CdSe nanowire **arrays** embedded in **anodic alumina** membrane by electrodeposition in ammonia alkaline solution containing CdCl2 and SeO2)
IT **1344-28-1**, Alumina, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(synthesis of highly ordered CdSe nanowire **arrays** embedded in **anodic alumina** membrane by electrodeposition in ammonia alkaline solution containing CdCl2 and SeO2)
IT 1306-24-7P, Cadmium selenide (CdSe), properties
RL: PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); PROC (Process)
(synthesis of highly ordered CdSe nanowire **arrays** embedded in **anodic alumina** membrane by electrodeposition in ammonia alkaline solution containing CdCl2 and SeO2)
IT 7664-41-7, Ammonia, properties
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)
(synthesis of highly ordered CdSe nanowire **arrays** embedded in **anodic alumina** membrane by electrodeposition in ammonia alkaline solution containing CdCl2 and SeO2)
IT 7446-08-4, Selenium oxide (SeO2) 10108-64-2, Cadmium chloride (CdCl2)
RL: RCT (Reactant); RACT (Reactant or reagent)

8/9/4 (Item 4 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


08615945 Genuine Article#: 307HT Number of References: 138
**Title**: Template-based synthesis of nanomaterials
Author(s): Huczko A (REPRINT)
Corporate Source: UNIV WARSAW,DEPT CHEM, PASTEURA 1/PL-02093 WARSAW//POLAND/ (REPRINT)
**Journal**: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING, 2000, V70, N4 ( APR), P365-376
ISSN: 0947-8396 **Publication Date**: 20000400
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Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences
Journal Subject Category: PHYSICS, APPLIED
**Abstract**: The large interest in nanostructures results from their numerous potential applications in various areas such as materials and biomedical sciences, electronics, optics, magnetism, energy storage, and electrochemistry. Ultrasmall building blocks have been found to exhibit a broad range of enhanced mechanical, optical, magnetic, and electronic properties compared to coarser-grained matter of the same chemical composition. In this paper various template techniques suitable for nanotechnology applications with emphasis on characterization of created arrays of tailored nanomaterials have been reviewed. These methods involve the fabrication of the desired material within the pores or channels of a nanoporous template. Track-etch membranes, porous alumina, and other nanoporous structures have been characterized as templates. They have been used to prepare nanometer-sized fibrils, rods, and tubules of conductive polymers, metals, semiconductors, carbons, and other solid matter. Electrochemical and electroless depositions, chemical polymerization, sol-gel deposition, and chemical vapour deposition have been presented as major template synthetic strategies. In particular, the template-based synthesis of carbon nanotubes has been demonstrated as this is the most promising class of new carbon-based materials for electronic and optic nanodevices as well as reinforcement nanocomposites.
Identifiers--KeyWord Plus(R): FILLING CARBON NANOTUBES; ATOMIC-SCALE MANIPULATION; ALUMINUM-OXIDE; ELECTRONIC-PROPERTIES; SUBSTITUTION-REACTION; MAGNETIC-PROPERTIES; METALLIC NANOWIRES; NITRIDE NANORODS; NANOMETER-SCALE; FIELD-EMISSION
Cited References:
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LI WZ, 1996, V274, P1701, SCIENCE

L118 ANSWER 15 OF 20 HCAPLUS **COPYRIGHT** ACS on STN
AN 2000:629505 HCAPLUS Full-text
DN 133:304298
ED Entered STN: 11 Sep 2000
TI Template-grown high-density **nanocapacitor arrays**
AU Shelimov, Konstantin B.; Davydov, Dmitri N.; Moskovits, Martin
CS Department of Chemistry, University of Toronto, Toronto, ON, M5S3H6, Can.
SO **Applied Physics Letters (2000)**, 77(11), 1722-1724
CODEN: APPLAB; ISSN: 0003-6951
PB American Institute of Physics
DT Journal
LA English
CC 76-10 (Electric Phenomena)
AB The fabrication and elec. properties of high-d. **arrays** of cylindrical **nanoscale** capacitors **grown in anodic Al oxide templates** is described. Using CVD, alternating metallic (carbon) and **insulating** (boron nitride) layers are created within the template pores, thereby forming composite metal/**insulator**/metal **nanotubules**. With the metal electrodes evaporated on the 2 sides of the template, the structure is converted to an **array** of **nanocapacitors** connected in parallel. For 50-μm-thick templates, specific capacitances as high as 2.5 μF/cm2 were measured and capacitances as high as 13 μF/cm2 should be attainable by optimizing the **insulating** layer properties. The fabrication process can be made compatible with the Si technol. and might, therefore, be used to fabricate high-capacitance elements on tightly packed chips. At the same time, the leakage resistance of the **arrays** fabricated in the preliminary studies reported here is rather low, presumably due to the contamination of the **insulating** layer.
ST carbon boron nitride **nanocapacitor array** alumina template
IT Vapor deposition process
(chemical; template-grown high-d. **nanocapacitor arrays**)
IT Capacitor electrodes
Capacitors
Electric capacitance
Electric resistance
Microstructure
(template-grown high-d. **nanocapacitor arrays**)
IT 7440-44-0, Carbon, properties **10043-11-5**, Boron nitride, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**nanotubule** composite; template-grown high-d. **nanocapacitor arrays**)
IT **1344-28-1**, Alumina, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(template material; template-grown high-d. **nanocapacitor arrays**)
RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
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IT **10043-11-5**, Boron nitride, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**nanotubule** composite; template-grown high-d. **nanocapacitor arrays**)
RN 10043-11-5 HCAPLUS
CN Boron nitride (BN) (8CI, 9CI) (CA INDEX NAME)

L84 ANSWER 19 OF 36 HCAPLUS **COPYRIGHT** ACS on STN
AN 2001:910917 HCAPLUS Full-text
DN 136:208244
ED Entered STN: 18 Dec 2001
TI Thin Au film with highly ordered **arrays** of hemispherical dots
AU Gao, T.; Fan, J. C.; Meng, G. W.; Chu, Z. Q.; Zhang, L. D.
CS Institute of Solid State Physics, Chinese Academy of Sciences, **Hefei**, 230031, Peop. Rep. China
SO **Thin Solid Films (2001)**, 401(1,2), 102-105
CODEN: THSFAP; ISSN: 0040-6090
PB Elsevier Science S.A.
DT Journal
LA English
CC 76-2 (Electric Phenomena)
AB **Thin Au films with highly ordered arrays of hemispherical dots** were fabricated by evaporating Au on the surface of porous **anodic alumina** template. The hemispherical Au dot **arrays** arranged in a hexagonal pattern are highly ordered. The densities of the hemispherical Au dots in the **array** are .apprx.1.2 + 1012 m-2 with dot diams. and heights of .apprx.80-100 and 40-50 nm, resp. The synthesis method presented herein is simple and suitable for the preparation of thin films with ordered hemispherical dot **arrays** in a large area using a wide range of materials.
ST gold dot **array** deposition alumina membrane
IT Membranes, nonbiological
Porous materials
**Quantum** dot devices
Vapor deposition process
(preparation of gold dot **arrays** by vapor deposition of gold on **anodized** porous **alumina** templates)
IT **1344-28-1**, Alumina, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); REM (Removal or disposal); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(preparation of gold dot **arrays** by vapor deposition of gold on **anodized** porous **alumina** templates)
IT 7440-57-5, Gold, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(preparation of gold dot **arrays** by vapor deposition of gold on **anodized** porous **alumina** templates)
RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

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